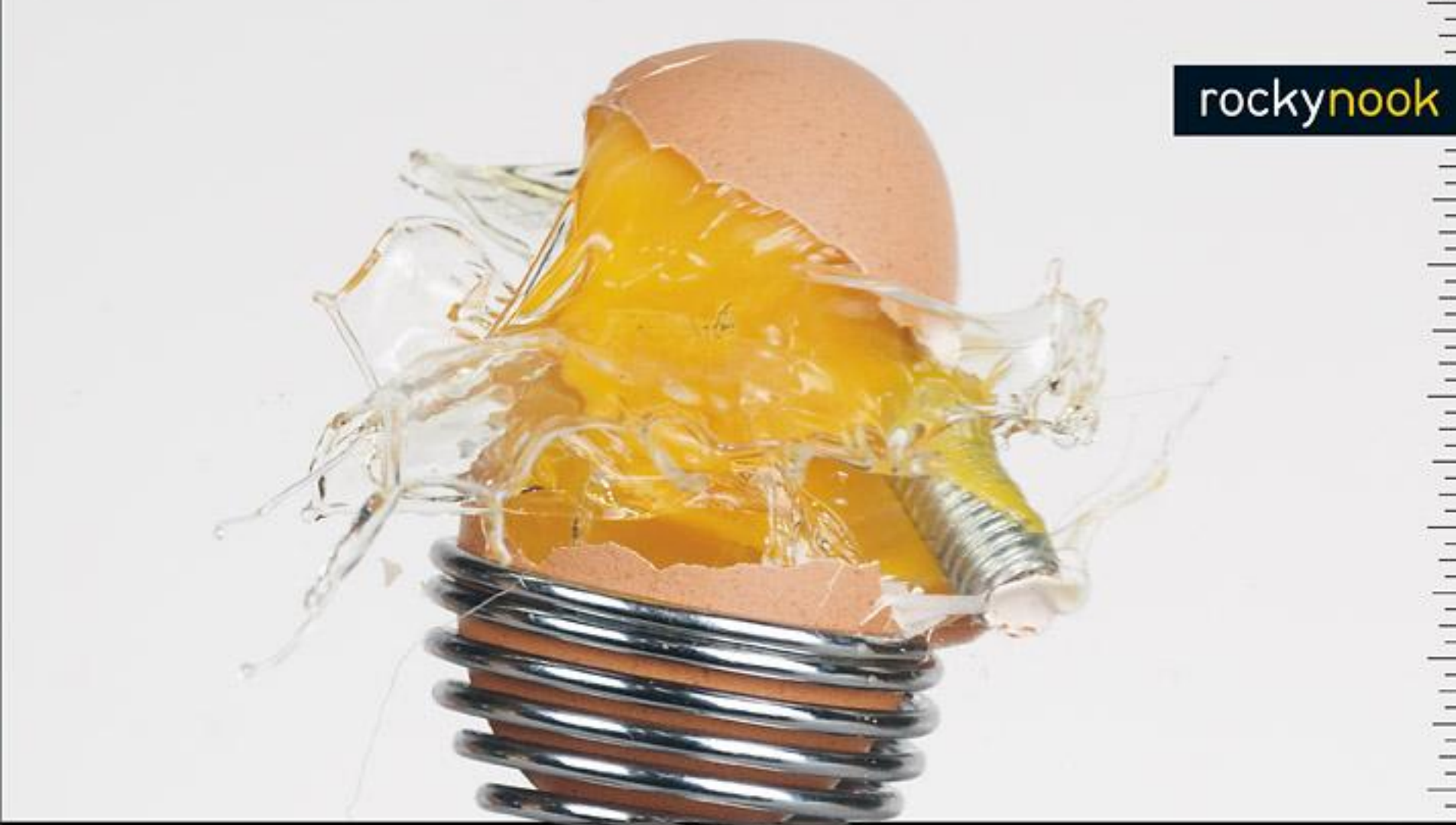


rockynook

Cyrill Harnischmacher

The Wild Side of Photography

Unconventional and Creative Techniques for the Courageous Photographer

The Wild Side of Photography

Project Editor: Gerhard Rossbach
Production Editor: Jimi DeRouen
Copyeditor: Lisa Danhi
Layout and type: Cyrill Harnischmacher
Cover design: Cyrill Harnischmacher
Cover photos: Cyrill Harnischmacher
Printer: Friesens Corp., Printed in Canada

ISBN 978-1-933952-51-2

1st Edition

26 West Mission Street, Ste 3
Santa Barbara, CA 93111-2432
www.rockynook.com

Library of Congress Cataloging-in-Publication Data
Harnischmacher, Cyrill.
[Wilde Seite der Fotografie. English]
The wild side of photography : unconventional and creative techniques for the courageous photographer / Cyrill Harnischmacher.
p. cm.
Translation of: Die wilde Seite der Fotografie: mit unkonventionellen Techniken eigene fotografische Ideen verwirklichen.
Includes bibliographical references.
ISBN 978-1-933952-51-2 (alk. paper)
1. Photography--Experiments. 2. Photography--Special effects. 3. Photography--Digital techniques. I. Title.
TR148.H3713 2010
775--dc22

2010023678

Distributed by O'Reilly Media
1005 Gravenstein Highway North
Sebastopol, CA 95472

This book is printed on acid-free paper

Cyrill Harnischmacher

The Wild Side of Photography

Unconventional and Creative Techniques for the Courageous Photographer

rockynook

A Walk on the Wild Side

In the late 1960s, the Canadian Willard Sterling and the US American George Elwood received the Nobel Prize for Physics for inventing the charge coupled device, or CCD. This invention and the developments in camera and software technology that followed hailed the start of a period of extreme visual creativity. As well as giving us previously unthinkable technical scope, modern digital technology has also allowed us to develop new emotional and conceptual approaches to taking and creating pictures. This book is intended to introduce you to part of the amazing spectrum of creative photographic techniques that has developed in the decades following the introduction of the CCD, although the ideas shown here represent just the tip of an enormous iceberg. The examples in this book have all been created by photographers who give their all to break with convention while pursuing their visual ideas. Many of the results demonstrate clearly that using modern technology doesn't have to exclude the use of tried and trusted analog techniques, and the main emphasis of most of the articles is on the "perfect" image and the techniques involved in producing it.

The themes covered range from experimental focusing to the combination of ultra-modern and "old school" photographic techniques, and include printing on exotic materials and the creative use of light. The desire to break new technical and creative ground is the common motivation shared by all of our authors, and the resulting images will amaze, impress, and satisfy you in equal parts.

I would like to thank all of our contributors for their commitment and inventiveness, without which this book would never have happened. We also hope we can inspire you to develop your own ideas and to discover your very own photographic wild side.

Cyrill Harnischmacher

Table of Contents

Landscape Blurs Part 1- Notes on Process and Approach	Alain Briot	1
Landscape Blurs Part 2 - Image Processing Workflow	Alain Briot	10
Show Time A Mini Photo Studio in Your Notebook Computer	Gerhard Rossbach	24
Near and Far Using Telephoto and Macro Lenses as Telescopes and Microscopes	Cyrill Harnischmacher	30
Camera Obscura Analog and Digital Pinhole Cameras	Tobias Pohl	38
Graffiti Made of Light Light Writing with LED Lamps	Niklas Plessing	46
The Earth from Above Kite Aerial Photography	Michael & Karen McAllister	56
Selective Focus Build Your Own Tilt/Shift Lens	Cyrill Harnischmacher	68
Color, Blur, and Verve Closeup Photography Revisited	Anett Boettcher	76
Diver Down A Look at the Fascinating World of Underwater Photography	Kai Wallasch	84

Night Sights
Using Flash Creatively in the Dark — Michael Diechtierow — 94

The Sun, the Moon, and the Stars
Simple Ways to Shoot Spectacular Astrophotos — Cyrill Harnischmacher — 104

Klip-Klap
Getting Started with Stereoscopic Photography — Tobias Pohl — 120

The Flatbed Camera
Taking Photos with Scanners — Gottfried Huettemann — 126

What do You Print On?
Printing Images on Unconventional Materials — Michael Benecke — 130

Gotcha!
High-Speed Photography Using a Photoelectric Shutter Release — Cyrill Harnischmacher — 138

Soft-Focus Lens
Create a Lensbaby Effect with Vaseline — Mike Hagen — 146

Little Planets
Seriously Twisted Panoramas — Christian Bloch — 154

Light Changes Everything
Using Dedicated Flash Professionally — Martin Krolop — 170

A View From Above
Aerial Photography with a Telescoping Monopod — Mike Hagen — 180

Camera Hacking
Activating Hidden Functionality in Canon Consumer Digicams — Berthold Daum — 190

The Authors — 208

Landscape Blurs

Part 1- Notes on Process and Approach

Alain Briot

Introduction

In the fall of 2008 I started working on a series of images whose main characteristic involved moving the camera while taking the photograph. This is a process I had tried in Paris in the early 1980s under the guidance of Scott McLeay, with whom I was studying photography at the time. Unfortunately, at that time my attempts had been unsuccessful for reasons we will see shortly.

The motivation for creating this series was related to my study and research of color and composition. Because these images cannot be composed as precisely as non-blurred photographs, and because colors get mixed with other colors when the camera is moved, I thought that they were near-perfect examples of composing with color instead of composing with shapes and objects.

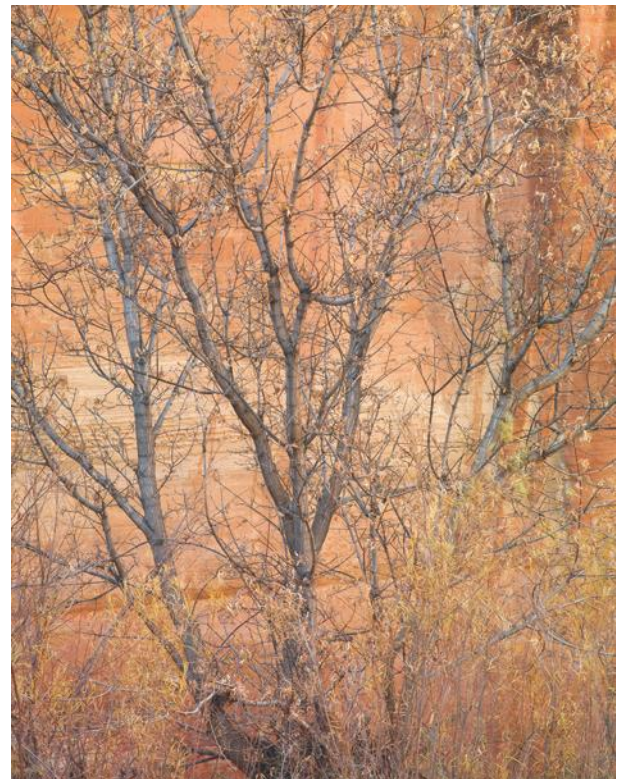
After working with these images for a while I found that they needed to rely on color, placement of elements, and use of shapes and lines to be successful. In other words, while color is very important for their success, so are the lines formed when moving the camera and so is the relationships of the different elements featured in the photographs.

This chapter details my experience using this approach. I like to call it "Landscape Blurs," first because landscapes are my subject and second because the images are blurred. Artistically blurred, mind you, but blurred nevertheless.

Finally, this is part 1 of a 2-part chapter. In part 2 I will go over the specific conversion and processing steps that I use in Lightroom 2.0 and in Photoshop CS4 to convert and optimize these images. These steps are different from the steps I follow with my non-blurred images.

From Film to Digital

Moving the camera while taking the photograph is truly a process that needs digital capture to be done successfully. My teacher in Paris, Scott McLeay, taught us this process in the early 1980's. Scott was using a Hasselblad V camera, the same camera I am using today for this process. However, Scott was using film (digital capture did not exist yet) and that was one of the main problems.



Trees along a Sandstone Wall, Utah
Non-blurred image

Scott was using this approach for his color work. However, with film he was limited to 24 exposures per roll maximum (if using 220 film) and even with multiple holders loaded and ready

Trees along a Sandstone Wall, Utah
Blurred image

to go, you had to keep yourself to a limited number of exposures. For example, if you had 4 holders each loaded with 220 film, that would give you 100 exposures. Few people had 4 Hasselblad 220 holders, so the actual number of photographs you could take before having to stop photographing was usually much smaller. Of course, you then had to unload the holders and reload them with new film. This was not only impractical, it also stopped the flow of things. It took you out of the creative mode, literally. With digital, things are much better. Right now I use 16 gb cards and that makes the process both easier and smoother. I can shoot over 200 or 300 exposures per card, and changing to a new card takes no time at all. This means I can focus on the process totally without having to fear getting interrupted by the necessity to unload and reload film holders.

Also, developing film took time and was expensive. With digital I can see the results immediately on the LCD screen, then confirm just minutes or hours later by converting the images on my computer. Finally, there is the issue of printing these images. Scott and I agreed that these images look great on matte or watercolor paper. Scott used the Fresson process to print his images Fresson prints are made on watercolor paper using a charcoal process that creates sophisticated tones and colors.

Fresson is a small printer located in France, near Paris. The proprietor selects the clients he wants to work with personally. His unique process uses charcoal to print both color and black and white images. The Fresson process delivers beautiful prints but it is slow, complicated, and expensive. The good news is that the look of a Fresson print is not unlike that of an archival inkjet print on Fine Art matte paper. However, the cost of an inkjet print is much more affordable than that of a Fresson print and there is no wait time since you can make this print yourself in your own studio.

All this means that creating images while moving the camera and printing them on matte papers has become much easier with digital than it was in the days of film. This provides a much greater access to a process that had been practiced before but was made difficult and exclusive by the limitations of film.

Boulder Mountain Trees, Utah

Detail from the area marked in red in the image left

Equipment

Like Scott, I use a Hasselblad V with Zeiss Lenses and I move the camera during long exposures. The difference is that, instead of film, I use a Phase One P45 digital back.

Being successful with this process is in large part due to developing the necessary experience. It literally takes hundreds if not thousands of shots to get a single good one. It is also important to spend time learning and finding out which subjects work and which subjects do not work.

The P45 gives me more colors and dynamic range than other cameras. This is important because this series is all about fine nuances of color and high contrast is something I want to avoid at all cost. I want soft contrast with as much variation of color as possible. The P45 gives me that.

The Hasselblad is also important because of the way it is held. I need to work handheld because there is no other way to move the camera the way I want to (a tripod does not work for this type of work). The Hasselblad makes holding and moving the camera easy because it is held at waist level, or slightly higher up if you look through the top viewfinder, with one hand positioned below the camera and the other hand positioned on the side of the camera. The position of the camera does not change when you go from a horizontal to a vertical framing because the back can be positioned vertically or horizontally. This means you can develop an ideal way of holding the camera, one that gives you the results you want movement-wise. You can then use this position, that is hold the camera the same way, whether you do horizontal or vertical photographs. This is an ideal solution since finding the ideal way of holding and moving the camera is largely responsible for making this approach successful.

Quality of Light

The type of light you use is very important. I work mainly outdoors (in fact almost always outdoors) and with natural light, so choosing the best time of day or weather conditions is very important.

Light is what creates the color in the scene. For this reason I prefer open shade or overcast light or sunset/sunrise light. These are the types of light that work best for my work. The soft light found in overcast or open shade conditions gives me soft colors that I would not get if the scene was lit by direct sunlight. In that case I would get mixed shadows and highlights, which creates a jumbled landscape with washed out colors and confusing areas of lightness and darkness.

When you move the camera, either a lot or a little, you mix not only the colors but also the light that falls on the different areas of the scene. In effect you merge the boundaries of objects that have different colors in them and different types of light falling upon them. The success of the image rests on doing this well, which most of the time means finding a scene in which you can control how many colors and how many different types of light are present.

Very often (most of the time in fact) I will select a scene because of the specific mix of colors and light found in it. Similarly, I will reject scenes that have a mix of colors and light that I do not like. Explaining exactly how I make this choice is difficult, but mainly I look for scenes that have a pleasant mix of light and colors. Most of all, I look for scenes in which the colors are harmonious, scenes in which the colors look good together and do not clash. I avoid scenes that have competing colors, colors that fight with each other (the way brilliant green and brilliant red do for example) instead of blending with each other. I keep in mind that this clash of colors will be emphasized when they are mixed together through the process of moving the camera.

An example of soft lighting resulting in washed out colors

Lenses

The choice of lenses is also very important. For one, I find it very difficult to crop these images, which means that using a lens that gives you the composition you want in the field is very important. It is hard to say why precisely, but I just do. I think it is because these images are somewhat complete as they come out of the camera. This is true for the composition and for the colors (more about this later when I talk about processing). In other words, I

Aspens Blur, Utah

have a difficult time isolating a composition within the composition that I created in the field. I prefer to move to a different capture when I don't like a specific image. It seems that the results are "all or nothing". It seems that an image either works or does not work. Therefore, it is difficult to fix it by cropping off part of it if it does not work. So far I have not cropped a single image in this series.

Processing

I capture the images in RAW format and I process the RAW files in Lightroom. When converting, I found that a number of approaches make things much easier and straightforward in processing images in this series.

First, I learned that setting the gray point (gray balancing) precisely is crucial to the success, or failure, of these images. As I said, these images are very responsive to the quality of light. This continues in RAW processing where color balancing the light properly is the continuation of selecting a specific type of light to photograph under.

Very often I find that I get the finest colors if I can find a neutral area in the scene and click on it with the color balancing eyedropper in Lightroom. This area does not have to be middle gray necessarily. It can also be white or black. It can also be a light or dark gray. All that is needed is an area that, once color balanced, is neutral in color. That is, an area that should not have color in it, no matter how light or dark this area might be.

Color balancing on a neutral area usually reveals the true colors in the scene and makes the photograph come to life. When that is found, I usually copy the color balance settings for this image then paste them to all the other images captured in the same light. This helps make the process more effective.

I also find that making presets for the setting combinations used for specific images is also very helpful. The specific settings used for each image can get very complex, and remembering them is not easy. Saving them under a specific name (I usually use the name of the photograph as the name of the preset) makes reusing them a breeze. It also allows you to build a library of presets that you can later reuse with other images. This gives you a good start to converting images for which you may not be sure which settings to use. It also helps give a feeling of consistency to the work since

the same settings are used from one shoot to the next, even if these settings are only a starting point and are modified later on.

One thing that is important to mention is that good processing is crucial in this series. Because these images retain little details to "clue us" about the nature of the scene, we depend on the color and contrast of the image even more than with images that are not blurred. For this reason setting black, white, and gray points properly is essential and, of course, knowledge of how to do so is an absolute prerequisite. Also, proper sharpening and contrast enhancement in Photoshop is just as crucial.

Finally, I use Lightroom to convert my images but complete the optimization process in Photoshop through the use of adjustment layers. I could not complete this process working in Lightroom alone.

Conclusion

I often say that fine art photography has two aspects: technical and creative. This process addresses both of these aspects. It is important to have good technique when moving and processing these images. However, it is equally important to be creative when selecting the subject and the light and when making processing choices in regards to color balance, color harmony, contrast, color palette, and so on.

I believe that this process has a lot of potential, and that what we have seen done with it so far is only the tip of the iceberg, so to speak. It is tempting to think that it is limited to certain subjects, such as trees. However, this is not true. This approach can be used with any subject, be it trees, mountains, deserts, waterscapes, or other. In fact, it can be used with subjects other than landscapes. Just because my personal preference is photographing landscapes does not mean that it has to be limited to this subject alone.

What can be done with this technique can only be known by trying it yourself with the subject of your choice. Don't be afraid to make mistakes. Mistakes are part of the creative process. Furthermore, what may seem like a mistake may in effect be a great photograph. You won't know until you try. Just go out and give it a go. You will be glad you did.

Also, stay tuned for part 2 of this chapter, in which I will describe the specific conversion and processing steps that I use in Lightroom 2.0 and in Photoshop CS4 to convert and optimize these images.

Overleaf left: Photo Elke Schulz
Overleaf right: Photo Rainer Gulbins

Landscape Blurs

Part 2 - Image Processing Workflow

Alain Briot

The lightroom "Develop" window as it looked when I worked on the images featured in this chapter.

Introduction

In my previous chapter, Landscape Blurs Part 1- Notes on Process and Approach, I described what motivates me to create the kind of images that I call "Landscape Blurs". I also talked about how I create these images in the field, including the equipment that I use, the type of light I look for, and the kind of compositions that lend themselves to these types of images.

In this second chapter in this 2-part series I am now presenting the processing workflow that I follow to convert and optimize these images. This workflow is specific to this type of image since their needs are somewhat different than "non-blurred" images.

Processing Workflow

Good processing is crucial with blurred images. Because these images retain little detail to "clue us" about the nature of the scene, we depend on the color and contrast of the image even more than with images that are not blurred. I found that a number of approaches make things much easier and more straightforward in processing, images in this series.

First, I learned that setting the black, white, and the gray points precisely is crucial to the success, or failure, of these images. As I said, these images are very responsive to the quality of light. This continues in RAW processing, where color balancing the light properly is the continuation of selecting a specific type of light to photograph under.

The final version of the image that is the subject of this chapter. The processing and optimizing workflow I followed to create this image are described below.

Very often I find that I get the finest colors if I can find a neutral area in the scene and click on it with the color balancing eyedropper in Lightroom. This area does not have to be middle gray necessarily. It can also be white or black. It can also be a light or dark gray. All that is needed is an area that, once color balanced, is neutral in color. That is, an area that should not have color in it, no matter how light or dark this area might be.

Color balancing on a neutral area usually reveals the true colors in the scene and makes the photograph come to life. When that is found I usually copy the color balance settings for this image then paste them to all the other images captured in the same light. This helps make the process more effective.

I also found that making presets for the setting combination used for specific images is also very helpful. The specific settings used for each image can get very complex, and remembering them is not easy. Saving them under a specific name (I usually use the name of the photograph as the name of the preset) makes reusing them a breeze. It also allows you to build a library of presets that you can later reuse with other images. This gives you a good start to converting images for which you may not be sure which settings to use. It also helps give a feeling of consistency to the work since the same settings are used from one shoot to the next, even if these settings are only a starting point and are modified later on.

Finally, I use Lightroom to convert my images and I complete the optimization process in Photoshop through the use of adjustment layers. I could not complete this process working in Lightroom alone.

RAW Conversion In Lightroom

My first step is converting the image from RAW to Tiff format. I currently use Lightroom for this part of my workflow, but other converters can work just as well. In fact I use different RAW converters for the conversion of other types of photographs. My choice of RAW converter is based on the needs of each photograph.

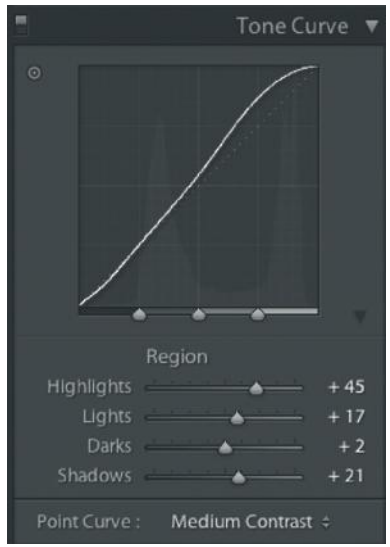
Below are screenshots of the adjustment settings I made to the image. For each setting I provide a before and an after screenshot. The image these settings were applied to is the one presented at the beginning of this chapter: Saguaros Blur.

A - Histogram, color balance and exposure adjustments

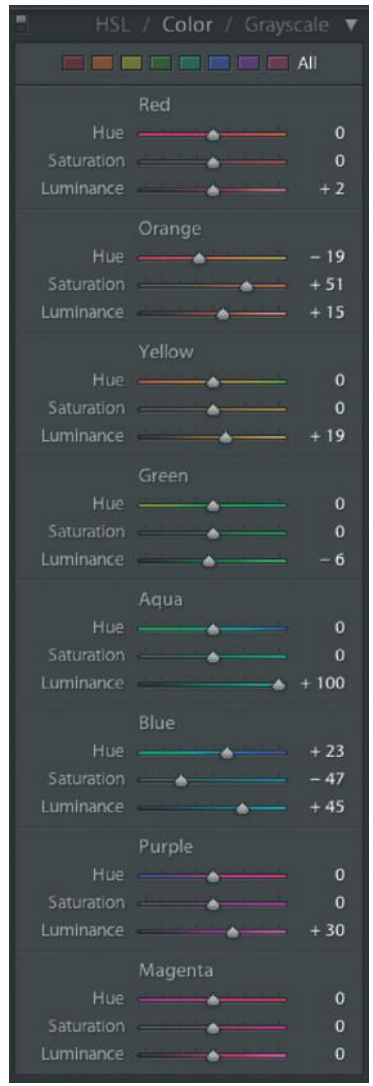
As shot

After adjustments

B - All the other adjustments I made in Lightroom



Tone curve

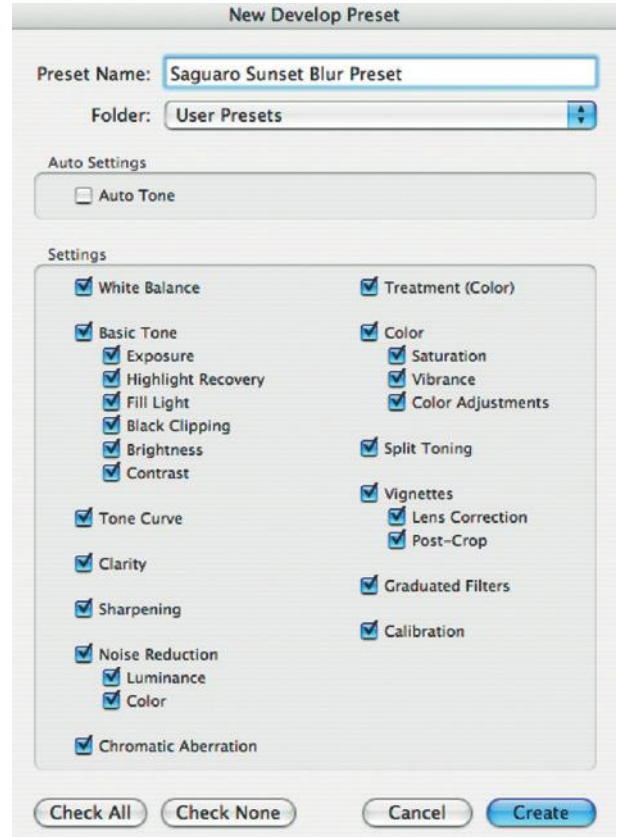


HSL

Sharpening and noise reduction

C - Lightroom Presets

I found that saving the image adjustment settings for specific images as presets in Lightroom to be very useful. The reason for that is simply the complexity of the adjustments I make to each image. It is very difficult to remember exactly what those are when you go from one image to another. It is when you want to use previous settings on a new image that the presets come in handy. Using presets is very simple, all you need to do is click on a specific preset and the settings saved in it will be applied to the image you are working on. I usually name each preset after the photograph they were originally designed for since this helps jog my memory about what each preset does. In case of doubt, or to quickly check what a preset looks like, all you have to do is pass the mouse pointer over the list of presets and the effect of each preset will be applied to the large thumbnail in the preview window. Once you find one you like simply click on it and the preset will be applied to the image you are working on.



The Develop Preset dialog box in Lightroom

A - Selective Color

Using Selective Color instead of curves allows you to darken a color without increasing the contrast of the image. This is achieved by adding black to a specific color (reds for example) instead of lowering the curve for that color. Lowering the curve means modifying not only the density of one color but also the contrast of that color. The two work together because curves do not provide a way to modify color without modifying contrast.

Selective color, on the other hand, allows you to modify color and contrast separately by affecting the density of a specific color. Increasing the density of blacks will add contrast to the image (contrast is largely defined by the black and white points settings) just like increasing or decreasing the level of whites will either lower or raise the contrast of the image.

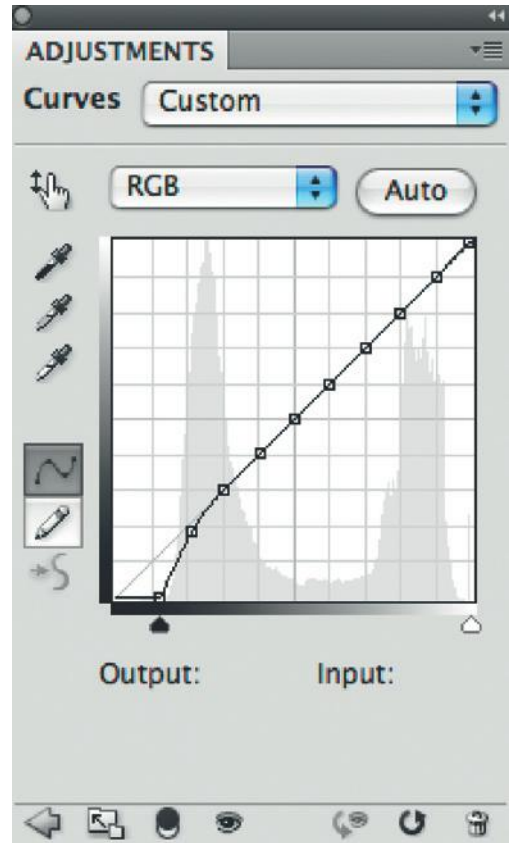
B - Black Point Adjustment Curve

Using a sudden black curve instead of setting the black point regularly (by steepening the entire curve) allows you to set a true black point for the image without increasing the contrast of the entire image.

Often you need a true black point for an image (most images do) but you do not want to either darken the entire image, or increase the contrast and the saturation of the entire image. Increasing contrast substantially results in increasing saturation as well. Often, you may want just one or the other, but if you steepen the entire curve you will get both.

Using a sudden black curve is the solution to excessive contrast and/or saturation maladies.

Sudden black is the key to creating images that are delicate and yet have a true black point. You no longer have to have chalky images in order to get a true black point.



Sudden black point adjustment curve

C - High Pass Contrast Filter

I found that using a high pass contrast filter on top of the image, after all the adjustment layers are completed, helps a lot in defining the detail level of the image.

Because these images are by nature less detailed, sometimes increasing the level of detail is necessary. This helps bring up the interest level in the image as well as make the image more engaging visually for the viewer.

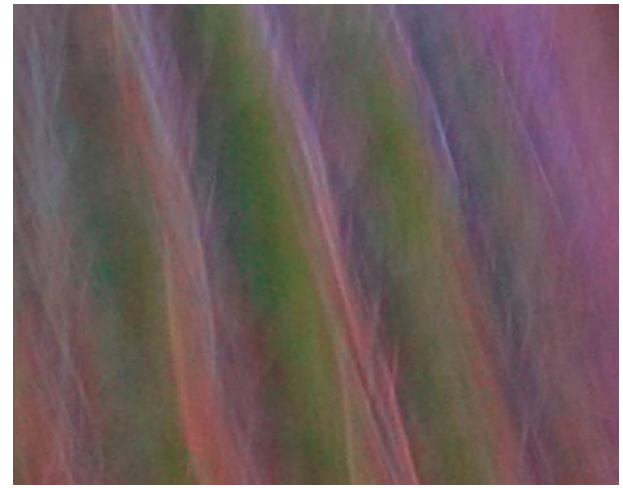
Of course adding details is not possible. All we can do is increase what is there. We cannot add anything new.

And again increasing what is there through sharpening only takes us so far since there is little detail to start with.

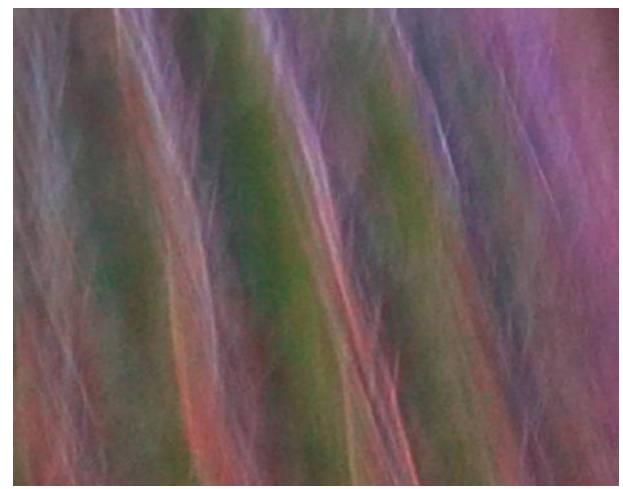
This is where High Pass Contrast processing comes in. This approach basically increases the local contrast between objects, or more appropriately here between the different areas of color and contrast. In effect, to my eyes, it increases the contrast of the lines in the image, the black level of these lines I think.

In the end it makes the image look a little bit less blurry and a little bit more defined. It helps strengthen it visually so that it stands out more as a complete image worthy of a lengthy visual examination. It helps increase the sophistication of the image by adding the impression of detail in an image where, at first glance, it would appear that we would find none.

I also find that increasing the opacity of the High Pass Contrast layer to 35% or 40% instead of the customary 20% is often necessary to get the maximum effect from this filter. A higher opacity can be used here since the effect of the filter is far less than on a normal-detail-level image.



Before high pass filter



After high pass filter

D - Smudge Tool

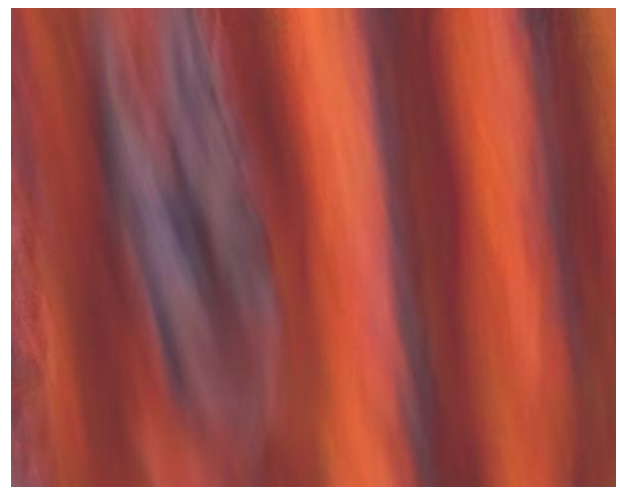
I also found that using the Smudge tool in CS4 is very useful in finalizing the image. In a photograph created while moving the camera through multiple tries, it is virtually impossible to control every shape and color in this image. Therefore, small areas are bound to go wrong and have the wrong line, or shape to them.

These areas have to be corrected otherwise they will create a visual deterrent to the enjoyment of the image. In other words, they won't look good and will create a visual distraction.

The simplest way to get rid of these problems is simply by smoothing them out with the smudge tool. Simply going over these areas with the tool, set at a small to medium diameter, or setting the diameter to the size of the problem area, will allow you to smooth them over quickly and effectively.

The nicest part is that the effect of the smudge tool when used in a dragging motion is to stretch an area. This stretching effect is very similar in look to the effect created by moving the camera up and down, sideways, etc. Therefore, by using the smudge tool to perfect some areas by reworking them, you will be continuing the visual effect created by moving the camera. In the end, the result is a smooth and seamless blend of in-camera and in-Photoshop effects that all go in the same direction and blend together perfectly well.

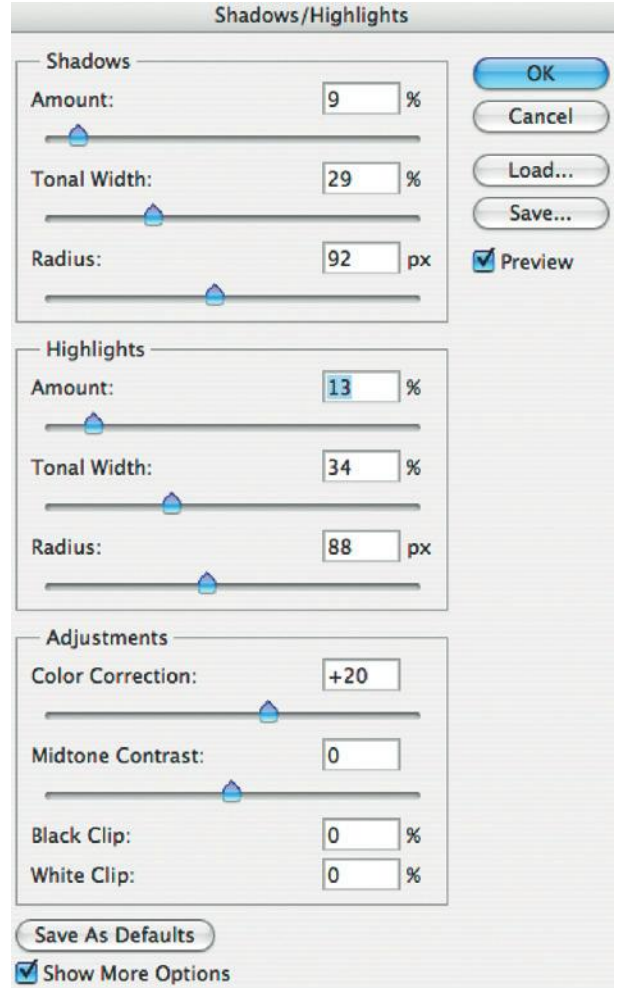
Before smudge tool



After smudge tool

E - Shadows/Highlights Adjustments

I find Shadows/Highlights to be a very effective way of controlling contrast. Shadows/Highlights gives the same results as can be obtained by local masking, but much faster. If used carefully, the results are just as good if not better. However, care must be taken not to push the settings too far because damage to the image can be done quite easily if this adjustment is not used carefully.



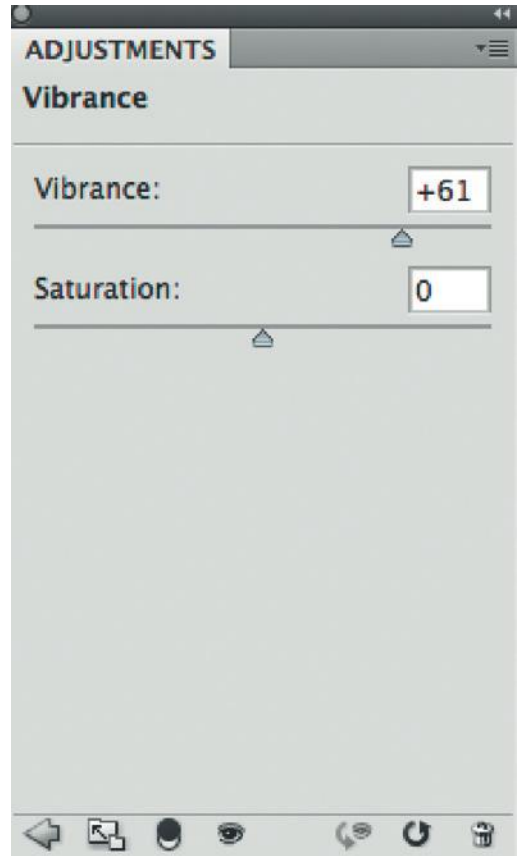
The settings used for Saguaros Blur

F - Vibrance Adjustment

Vibrance is a new adjustment layer available in CS4. Prior to CS4 Vibrance was available in Lightroom and in Adobe Camera Raw, but not in Photoshop.

Vibrance is a type of saturation increase. In fact, since these two adjustments are somewhat similar, they are offered in the same layer adjustment palette. However, Vibrance is preferable to Saturation, or best used in combination with Saturation. The reason being that Vibrance provides more subtle results than Saturation.

Basically, Vibrance saturates low saturation colors more than high saturation colors. In other words, it is a "smart" saturation adjustment. Saturation on the opposite saturates all colors evenly, resulting in images that are often oversaturated, either globally or locally. However, the nice thing about the Saturation adjustment layer is that it gives access to individual colors (red, green, blue, yellow, etc.) while Vibrance does not.



The Vibrance adjustment applied to Saguaros Blur

Two other photographs created during the same shoot as the image discussed in this chapter
Left: Single Saguaro Sunset Blur Right: Triple Saguaro Sunset Blur

Conclusion

Processing blurred photographs is not difficult if you follow the correct workflow. I devised the workflow presented in this chapter after multiple tests and trials. The images processed this way print beautifully, and that to me is the final test since my goal is to create fine art prints.

Feel free to experiment with this workflow by changing the settings to make them fit the specific needs of your images and of your inspiration. You can't hurt anything by trying as long as you back up your work so that you can return to a previous version if the need arises.

Show Time

A Mini Photo Studio in Your Notebook Computer

Gerhard Rossbach

A complete notebook studio setup, ready for shooting

The idea is simple: Take a notebook computer and use it to build a photo stage for your subject, with lights and scenery included.

But why use a computer? There are enough mini studios on the market: either collapsible or permanent, more or less robust, and all with their own dedicated lights. More robust mini studios are especially suitable for product shoots (for shooting eBay snaps, for instance), but can be quite expensive and only allow limited scope for scene changes. A mini studio generally has only one single-colored, curved background (usually white) and one or two built-in fluorescent lamps. But how can you easily provide your

subject with a custom background like a natural texture (such as stones or water), a still landscape, or a technical pattern?

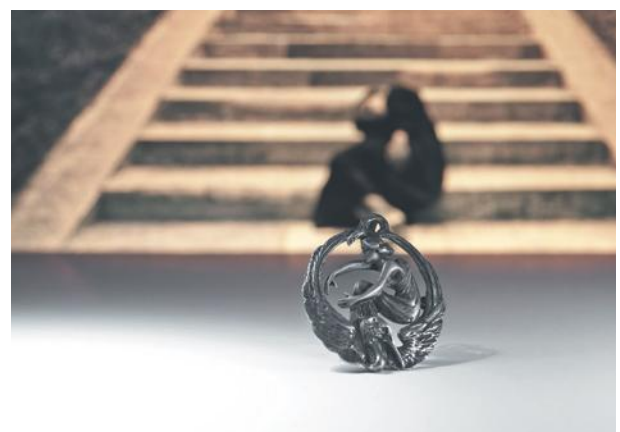
This is where your notebook comes into play and helps to eliminate the limitations of a conventional studio setup. An LCD monitor can immediately provide you with any background image you like and, if your computer batteries have enough juice, with additional lighting too, making you independent of fixed power supplies or wall outlets.

The background in a notebook mini studio is automatically well lit due to the LCD panel, and there are various types of USB-powered LED lamps available for lighting the subject itself. These usually have between three and ten LEDs and have flexible goose-neck mounts. This type of lamp delivers sufficient light and only costs a few dollars.

The illustration on the left shows a complete "notebook studio" setup with one each 5- and 10-LED lamps. You can use either a stiff card or a sheet of foam to cover your notebook's keyboard. Additionally, it is generally best to set up your chosen background image as a screensaver, as this is the simplest way to cover the entire screen area with an icon-free image. You can, of course, also use an image processing program such as Photoshop or Lightroom to shift, scale, and manipulate your background image to suit your particular shot.

LED lamps, such as those shown in the illustration, deliver enough power to produce exposure values of around seven or eight at f/8 and ISO 400. This equates to shutter speeds of between 1/8 and 1/15 second, making a tripod or other stable camera support indispensible. The lamps need to be positioned closer to the subject than those shown in the illustration, as the amount of light reaching the subject decreases at a rate equivalent to the square of the subject distance. Make sure that the lamps don't protrude into the frame or cause any unwanted reflections on the

The light produced by the LED lamps and the notebook has a heavy blue cast that usually needs correcting.



You can remove the color cast either by setting white balance manually or using image processing software.

monitor's surface. Matte monitors are generally better than glossy ones for this type of work. LED lamps produce a cold, blue light that needs to be corrected later by shifting the image white point towards a more neutral value. The notebook in our example is a MacBook Pro, and our sample images were shot using a Nikon D700 at ISO 400 with a 60 mm lens set to a medium aperture. We corrected the white balance in Photoshop Lightroom.

An interesting variation on the standard setup shown here is to use transparent or reflective baseboards instead of the foam sheet we used. This creates interesting lighting effects and helps to increase the light yield of the LED lamps. A notebook studio also provides a great starting point for video experiments and can be a useful emergency solution for use with a mobile phone camera if you need an image in a hurry when you are on the road—i.e., if you need to produce acceptable product shots without the use of a power supply or a real camera!

Notebook studios are particularly suitable for photographing jewelry, watches, and other small objects.

You can use your notebook and the camera in your mobile phone to create interesting images on the road.

Near and Far

Using Telephoto and Macro Lenses as Telescopes and Microscopes

Cyrill Harnischmacher

A suitable adapter and eyepiece turn a telephoto lens into a bright, high quality telescope.

You need an eyepiece, an adapter (T2 to eyepiece thread), and a customized lens cap.

The eyepiece is fixed to its mount using set screws. Magnification varies depending on the focal length of the eyepiece.

Nearly every SLR owner has either a telephoto or macro lens (or both) for specialized photographic use. These types of lenses can also, however, be converted for use as high quality telescopes or microscopes with just a little technical know-how and a couple of extra parts. Don't worry—your lens can still be used as a lens afterwards!

Telescopes

Let's start with our long lenses. Here, it is immaterial whether you have a zoom or a fixed focal length telephoto. It is, however, important that your lens has a built-in tripod mount. You can build a compact telescope that is powerful enough for observing details on the surface of the Moon using a mirror telephoto with a 2x teleconverter and a 20 mm eyepiece. The relatively small maximum aperture that mirror lenses usually have is not a significant disadvantage, especially for viewing a full moon. However, bright, fixed focal length lenses are a better alternative if you want to observe clusters of stars. The image quality and brightness of many camera lenses is directly comparable with that of even the most expensive telescopes.

The type of eyepiece you use and the focal length of your lens influence the magnification you can achieve, and you can calculate the exact magnification by dividing the focal length of your lens by the focal length of the eyepiece. For example: a 300 mm lens used with a 25 mm eyepiece results in a 12x (=300/25) magnification, and a 10 mm eyepiece would result in a 30x magnification if used with the same lens. If you are using a zoom lens, you can calculate the zoom range of your improvised telescope by inserting the limits of the zoom range into the same formula. You can also use a zoom eyepiece (7-21 mm is a common range) in conjunction with fixed focal length lenses to produce a range of magnifications.

A diagonal prism gives you an upright image and a comfortable viewing position above the main body of your telescope.

Converting Your Lens

The simplest type of conversion involves a modified lens cap, a T2-to-eyepiece adapter and a special mount for the eyepiece. The adapter and the mount are easily available at most specialty astronomy stores (www.buytelescopes.com, for example). The custom lens cap forms the join between the lens and the eyepiece mount and you will need to make a hole in it that can accommodate the T2 thread end of the mount. First, cut a rough hole using a metal drill or a scroll saw, then smooth out the edges of your hole using a semi-circular file until the T2 thread just fits into the opening. The final step involves cementing the eyepiece mount to the lens cap using a two-component epoxy or super glue. It is important for the resulting join to be stable, especially if you are planning to mount a camera on the eyepiece later. Now all you have to do is fix the modified lens cap to the lens and mount the eyepiece in its holder. Focus your lens to infinity and adjust the eyepiece until you can see a sharp image. You can now fix this setting using the set screws in the eyepiece mount. This method works for most lenses, but if you are unable to focus a sharp image, your lens probably doesn't have sufficient back focus range. You can work around this problem by shortening the eyepiece mount by a couple of millimeters using a hacksaw.

The refractor telescope you have just built produces an inverted mirror image and is ideal for observing the Moon or the stars. If you want to use your telescope for nature observation, you will need to insert a roof prism or a diagonal prism between the lens and the eyepiece. A roof prism produces an upright, non-mirror image while a diagonal prism produces an upright mirror image of the subject. Attaching a prism lengthens the light path within the telescope, and can result in your lens no longer being able to form a sharp image at infinity. You can often work around this problem by shortening the eyepiece and/or the prism. If you own an old telephoto lens with a built-in T2 thread (such as a 500 mm Beroflex) you can even screw your eyepiece mount directly to the lens without modifying the lens cap first—there is no simpler way to turn a lens into a telescope!

PLEASE NOTE: If you want to observe the sun without risking severe damage to your eyes, it is essential to mount a special glare reduction filter on the front your telescope. For more information on this subject, please see the "The Sun, the Moon, and the Stars" chapter in this book.

Digiscoping

It may at first appear to be a slightly odd idea, using a compact digital camera to take photos through your homemade telescope, but the technique does have some distinct advantages. Compact cameras generally produce less camera shake than their larger SLR cousins, and the live view on the camera's monitor helps you to compose your shot before releasing the shutter. Another advantage is the large magnification factor provided by the combination of lens and eyepiece, which often allows you to shoot highly magnified details of your subject (the surface of the Moon, for example). Most specialty astronomy stores also carry a range of adapters for attaching compact cameras to various types of eyepiece. Using this technique can lead to vignette effects and can even produce fully circular images with black borders. Therefore, it is advisable to use an eyepiece with the widest possible aperture and largest possible field of view (i.e., with the shortest possible focal length). You can also use a camcorder or a webcam to record moving images at extreme (and otherwise unobtainable) focal lengths.

If you want to shoot shake-free stills or video through a telescope, it is very important to use a stable tripod and, if possible, a cable or infrared shutter release (or the camera's built-in self-timer). This way, any vibrations caused by telescope adjustments can dissipate before the shutter is released. If you own more than one telephoto lens, you can use one for taking photos while you use another with your home-made eyepiece adapter for pure observation purposes. This can help to pass the time with extra observations during long, timed exposures of astronomical subjects.

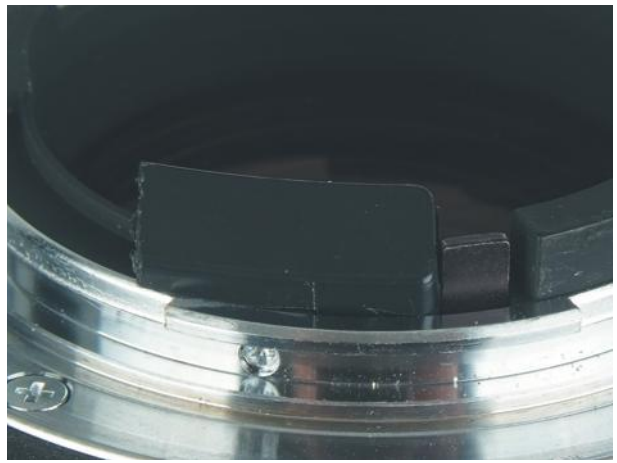
You can use an adapter to attach a compact camera to your homemade telescope

A Simple Microscope

You can use a macro lens microscope handheld for focal lengths right up to 50 mm (for example, for outdoor plant or insect observation). An improvised portable microscope can also help you find elusive dirt and dust when you are cleaning your DSLR's image sensor.

If you can, it is best to use a macro lens with a built-in tripod mount. Such lenses are fairly rare, but you can always use a telephoto lens with extension tubes to achieve the same macro effect. Some lenses don't have manually adjustable aperture rings, making it necessary to manually deactivate the automatic aperture before mounting the lens. It goes without saying that you should take great care when manipulating the mechanics of your lens.

You can build a simple stand for your microscope using a clip with a tripod thread, a baseboard (a kitchen cutting board, for example), and a piece of square tubing. Longer macro lenses allow you to use greater subject distances to observe larger objects and to adjust the lighting individually for your chosen subject. You can use a simple reading lamp at home or a pocket flashlight when



If your lens doesn't have a manually adjustable aperture ring, you will need to deactivate the aperture mechanism yourself. Here, I used a small piece of plastic.

Depending on the eyepiece you use, you can achieve magnifications of 1:1 and more. Photo: Jona Harnischmacher

Old lenses, bellows units, and extension tubes form a great basis for experimenting with custom optics.

you are out and about. Here too, you can use different eyepieces to achieve different magnifications and you can use a compact camera attached to the eyepiece to shoot macro images that you would not otherwise be able to capture.

Don't Be Afraid to Experiment

You can use your homemade eyepiece mount to experiment with other lenses from your collection. You are not limited to modern, autofocus lenses, and you can achieve striking effects using close-up lenses, extension tubes, or teleconverters with your new accessory. Try using a reversed standard lens, or an old bellows unit, or a telezoom with an extension tube, or a wide-angle lens... Many "retired" lenses can achieve a new lease of life if used creatively.

Here, a 150 mm f/2.8 macro lens has been converted into a powerful microscope using just a tripod mount and a simple stand.

Camera Obscura

Analog and Digital Pinhole Cameras

Tobias Pohl

In the 4th century, long before photography was invented, reports were made of an inverted image produced by a small hole in the roof of a darkened room. Later, in the 13th century, astronomers used this "camera obscura" ("dark room") to observe eclipses and sunspots with the naked eye. While researching the behavior of light, Leonardo da Vinci found that using the pinhole principle to produce images is very similar to the way the human eye sees. In the middle ages, the dark pinhole began to be replaced by ground lenses that were used to project images onto screens. These images were often used by painters as a drawing aid. Much later (around 1826), the Frenchman Niepce used an 8-hour exposure to take the world's first photograph

The Pinhole

Most of you will have built a pinhole camera at school using a shoe box and aluminum foil, and you will have marveled at the magical image produced on the tracing paper at the back of the box. This basic principle of pinhole photography hasn't changed, but has to be applied precisely in order to achieve good results. A hole in a piece of foil made using a needle is seldom genuinely round, and will probably be too large for practical use. This article describes the simplest way to produce a usable pinhole camera using methods pulled together from various places on the Internet.

First, we make a dent in a piece of thin aluminum (such as the safety cover from a computer diskette or the bottom of a tea candle holder) using a ball-pen. We then rub the convex side of the dent down using sandpaper and finally make a hole in the resulting surface using a fine needle. With a little practice, you should be able to produce a hole with a diameter of about 0.3 mm.

The Optics of Pinholes

It would overreach the scope of this book to go into detail here, but there are specific reasons why 0.3 mm is a good size for a camera pinhole. The two most important parameters governing pinhole size are based in geometrical and wave optics and concern the size of a hole's circle of confusion and the diffraction caused by its edges.

The larger the pinhole, the smaller the circle of confusion becomes, while the diffraction caused by the hole's edges increases with decreasing pinhole size. According to Gottfried Schroeder, in his book *Technical Optics*, you can calculate the optimum pinhole size using the following formula:

$$D = 1.6\sqrt{a' \cdot \lambda}$$

where a' = the subject distance, D = the pinhole diameter, and λ= the wavelength of the incident light.

Using a Canon camera with a 50 mm distance between the pinhole and the image sensor and light with a 550 nm wavelength, the resulting optimum pinhole size is 0.265 mm. The ideal pinhole size is thus largely dependent on the distance between the pinhole and the film (or sensor) and also the subject distance. If using this formula is too complicated for you, you can simply use one of the calculators listed at the end of the chapter without having to concern yourself with why the results turn out as they do.

Back to Our Construction Kit

Once you have made your pinhole, you need to color the rest of the metal plate black in order to avoid stray light causing unwanted reflections within the camera. Next, we cut an approximately 4 mm hole in the front of the lens cap (or in a cheap accessory lens cap); countersinking the hole will also help to avoid additional stray light entering the camera. In order to produce the best possible illumination of the final image the hole needs to be exactly in the center of the lens cap.

First Attempts

You now need to get some practice with your new pinhole. Exposure metering has to be set manually when you are using a pinhole lens, and you can only really find out the best values for each subject using trial-and-error. A pinhole has an aperture equivalent to about f/147, making it impossible to use the viewfinder in the normal way. You will have to make your settings using a "real" lens with a similar focal length to that of your pinhole setup. A 44 mm zoom setting or a 50 mm standard lens will generally do the trick for for a full-frame camera such as a Canon EOS 5D. Remember to include the crop factor if you are using a camera with a smaller sensor. The best way to check your settings is to use a separate 50 mm viewfinder attached to the camera's accessory shoe—a method that usually causes a few grins among observers who don't know that a pinhole is in use. A stable tripod is essential when taking pinhole shots as the necessary exposure times range from a number of seconds to minutes. Using your camera's mirror-up setting (if available) and a cable or infrared shutter release also help to reduce camera shake.

An accessory viewfinder helps when you are setting up pinhole shots Photo: Cyrill Harnischmacher

The finished lens cap complete with pinhole

A DSLR with a pinhole attachment mounted

An analog pinhole camera made from an old 6x6 bellows camera

Dirty Sensors

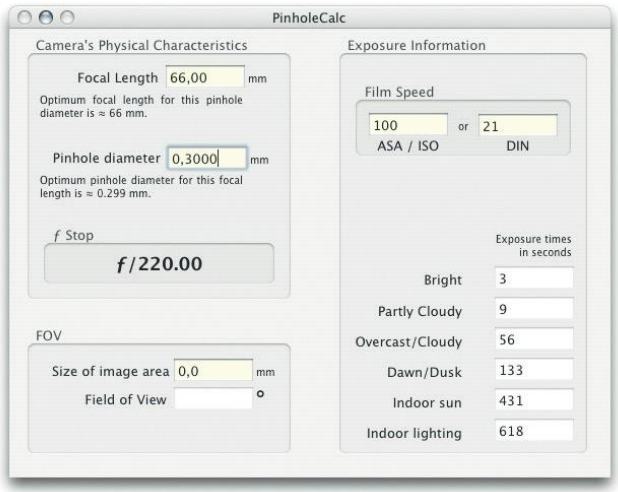
As you can imagine, an f/147 aperture produces enormous depth of field and, unfortunately, also makes normally invisible dirt on the camera's sensor visible. Such dirt normally lies outside the field of focus and usually only causes gray, out-of-focus areas in the image. In the case of a pinhole image, blurred dirt detail appears in sharp focus. For those whose cameras have an automatic sensor-cleaning function this is not a worry. Everyone else (myself included) will simply have to clean the sensor before shooting. You can, of course, use this characteristic of pinholes to check whether your sensor is clean before shooting conventional photos.

Problems with Flange Depth

A lens-cap pinhole for mounting on a (D)SLR is easy to construct and produces typical-looking pinhole images. However, a simple pinhole still lacks the wide angle of view and vignette effects that characterize "classic" pinhole images. Whether you are exposing film or a sensor, the depth of the mirror box and the lens flange dictate the angle of view you can shoot. The pinhole angle of view of DSLRs with smaller sensors is even narrower than that of a full-frame camera, resulting in even more homogenous-looking images. If you are not happy with your digital pinhole results, you can always resort to using your good old analog camera with all the creative possibilities and varied shooting media it offers.

With some practice and a little effort, you can produce astounding, well-rounded pinhole images. You can even build a pinhole camera using a coke can and a piece of sheet film. I usually have about ten "coke can" cameras loaded and ready for action. You can use old medium format rangefinder cameras for pinhole work, too, simply by replacing the lens plate with a home-made pinhole.

Right: Pont Du Gard (France), Canon EOS 5D



There are a large number of interesting pinhole-related tools available on the Internet

You can then vary the angle of view of your shot by adjusting the length of the camera's built-in bellows—a pinhole camera with zoom functionality! And you can use an old, lightproof wooden camera to expose sheet film. Here, too, the shallower the camera's physical dimensions, the better the resulting images will be. There are no limits to the creative applications of pinhole photography and you can even build a working pinhole camera using a match-box, a single frame of 35mm film, and black masking tape. The only proviso is that your camera is lightproof.

Black-and-white pinhole images are especially pleasing. The vignette effect in this photo was added later.
Photo: Cyrill Harnischmacher

All of the experiments I have described are suggestions and none include any form of light metering. Complete precision is not really necessary when shooting pinhole images, but you need to know approximately what values you are aiming for. The two tools listed below are designed to help Windows and Mac users to calculate pinhole exposure values.

- Pinhole size calculator for Windows:
  www.pinhole.cz
- And an equivalent tool for Mac:
  www.concepthouse.com/products/PinholeCalc

Graffiti Made of Light

Light Writing with LED Lamps

Niklas Plessing

Every photographer is familiar with the light trails that occur when the camera or the light source is moved during a long exposure. Light trails can be distracting but can also be used deliberately and creatively. Although photographers around the world have been creating complex light "paintings" for years now, this kind of photographic image has been enjoying a serious boom in the last two or three years. This is due in part to the increasing availability of cheap, portable LED lamps that provide bright light while using relatively little power. I am going to use this chapter to introduce you to some contemporary light writing techniques, and tell you how to produce legal and environmentally friendly graffiti!

Equipment

The fact that nowadays it is much easier to capture light writing images has also helped increase the popularity of the idea. In the past, you had to transport heavy, battery-powered lamps to your chosen location. Nowadays, LED lamps of all sizes can be found just about anywhere. Together with a camera, they can be used to produce simple, spontaneous light writing pieces. The simplicity and cheapness of the digital photographic process has also helped to popularize light writing.

My basic equipment: various battery-powered, colored LED fairy lights, an LED workshop lamp masked with multicolored plastic gels, and a powerful, varicolor LED flashlight.

Creating the image you have in mind often takes practice, especially when you are starting out. Digital cameras make it easier to check your results and accelerate the learning process, but it is, nevertheless, necessary to plan your light writing shoot carefully. I will explain the necessary steps in the following sections.

Your Camera

The more complex your idea, the longer the exposure will have to be, and the more manual settings your camera has, the better you can fine-tune the shooting process. Most modern DSLRs and many compact digital cameras allow you to set aperture, shutter speed, and ISO values manually. Your choice of lens will also depend on the type of "painting" you are making, and larger light writings will require the use of wider angle lenses in order to capture the whole piece. Standard focal lengths (up to 100 mm) can be used to capture details, but longer lenses usually have too narrow an angle of view to be of much use for this type of work.

Sources of Light

Basically, you can use anything that lights up to perform light writing: flares, torches, flashlights, light sticks, or cigarette lighters; but, as already mentioned, LED lamps offer the most flexibility. The Internet appears to be the best place to purchase LED lamps, and a quick search using terms such as "LED lamp", "battery-powered LED", or "LED fairy lights" will provide you with numerous places to buy lamps, often cheaper than at a store. There are also some useful links listed at the end of this chapter. Once you start

Light writing piece, La Gomera (Canary Islands): f/22, 3 seconds at ISO 100

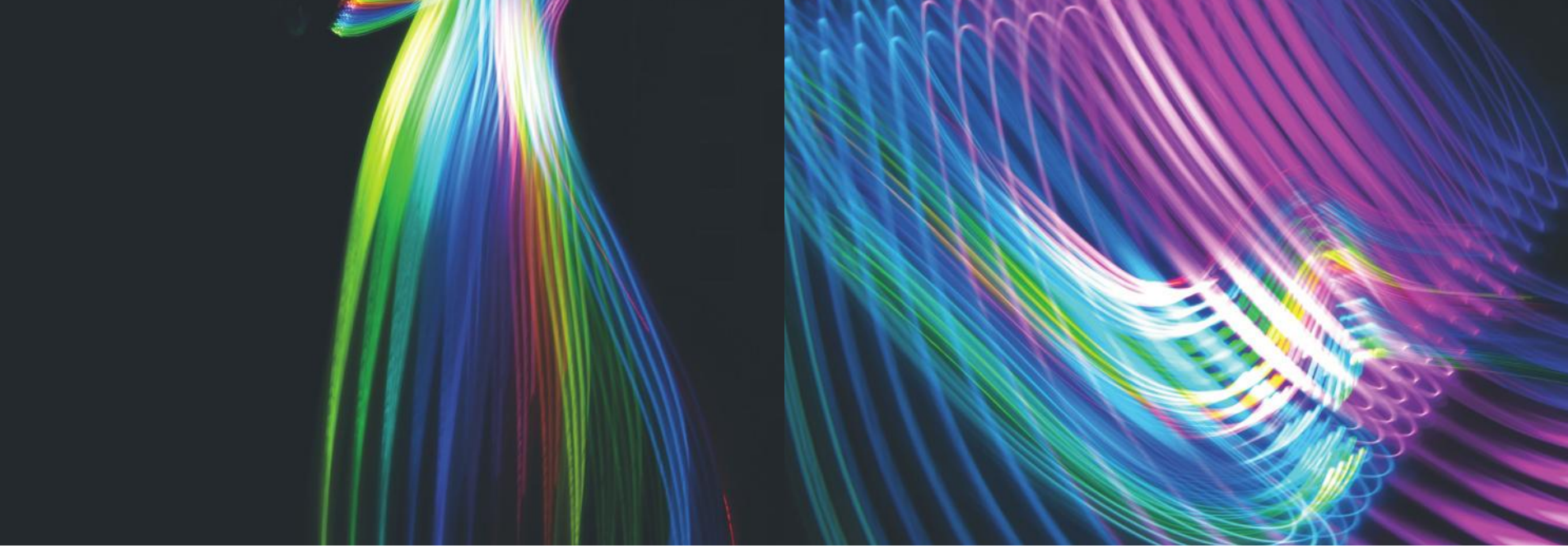
looking for LEDs, you will probably start to find them everywhere, and most "dollar stores" carry a range of suitable lamps.

Tripods

Your tripod doesn't have to an expensive one, but should nevertheless be stable enough to prevent camera shake during long exposures. You can always use the ground, a handrail, or your backpack as a camera support, but a tripod is the most flexible alternative.

Other Accessories

If white light is too boring, you can introduce some color into your light writing using colored gels. You can either purchase individual gels at a hobby shop or you can buy a trial pack of professional movie light gels at a specialty store. Trial packs include two or three inch samples of up to 300 different colored gels and are ideal for light writing. You can attach them to your lamp quickly and easily with adhesive tape and you can reuse them as often as you like. Make sure you carry enough spare batteries for your lights



Free-form pieces: both exposed for 2 seconds at f/22 and ISO 100

and your camera. It is often difficult to judge in advance how long a shoot will take, and dead batteries in the middle of a complex sequence can be really frustrating. If you know a little about hobby electronics, you can also build more complex lighting rigs with, for example, with blinking lights. Once again, the Internet is a great source of ideas and resources for circuit diagrams as well as for purchasing components.

Planning Your Shoot

So what is the next step once you have got your equipment together? The planning stage is a very important part of a light writing shoot, and it is difficult to achieve satisfactory results if you are working alone. Teamwork and good communication skills are essential if you want your shoot to run smoothly.

What to Write?

Start small. It is quite hard to achieve good results right away, and it will take some practice until you are able to fully use your environment and the natural backgrounds it provides. My group meets regularly for light writing sessions and, in order to avoid disappointment, we often limit ourselves to writing simple forms using a limited set of colors.

When to Go Light Writing

The best time to go light writing is between dusk and dawn. Too much ambient light—combined with long exposures—will produce overexposed images and will reduce the effectiveness of the light trails. Dark blue skies at late dusk or early dawn are a particularly effective stylistic element in many light writing images.

Where Can I Go Light Writing?

There are no limits to where you can make light writings, but some settings are more effective than others. At the end of the day, the success of a shot depends on the photographer's ability to "see" his image and to integrate his ideas into the scenery and the available light. Artificial light sources (such as street lamps) can be just as effective as natural moonlight when it comes to writing on a natural background.

How Many People Are Involved?

In addition to the photographer (who deals with the camera settings) you will need at least one "writer", who uses whatever light sources you have chosen to "paint" your planned shapes, words, or other strokes in the air for as long as the camera's shutter remains open. It is theoretically possible to work with a remote shutter release, allowing the photographer to take part in the writing, but experience has shown that it is much more efficient if one person stays with the camera to concentrate on fine-tuning framing, shutter speed, focus, or other technical aspects of the shot. The more people that are involved, the more you will have to deal with individual ideas during a shoot. As mentioned above, good teamwork is critical if you want your shoot to be a success.

Excerpt from a light writing video, shot using a 10mm fisheye lens

Camera Settings

The following section deals with some settings that you can make (camera options permitting) to help you capture light writing pieces effectively. Once you have gained some experience, you will learn to recognize which settings help to optimize your images in particular ways.

- Shutter Priority Auto mode (usually labeled "S", "Sp", or "Tv") is generally the best mode to use, as it allows you to select the ideal shutter speed for your planned shot. The camera automatically selects the appropriate aperture.
- Select the lowest possible ISO value. This keeps image noise to a minimum.
- Use Matrix exposure metering mode. This keeps the back ground exposure balanced.
- Auto White Balance seldom produces desirable results when you are shooting in the dark. If your ambient light source has an orange cast (as is the case with most street lamps), set white balance to "Daylight" in order to keep your results authentic-looking. There is no real rule of thumb here, as night scenes are usually lit by mixed light sources with differing color temperatures. A camera that is capable of shooting RAW-format images is a great advantage, as you can adjust white balance in RAW images later on a computer.

- Switch off any automatic noise reduction systems your camera may have. Such functionality simply reduces battery life, and you can reduce noise more effectively later on a computer anyway.
- Switch off your flash. Flash should only be used if you need it to integrate complex lettering or logos shot using templates in your shot.
- If your camera has an automatic chromatic aberration correction function, switch it off. This feature often (incorrectly) interprets your painstakingly produced light trails as image errors and attempts to "correct" them, producing additional, unwanted light smears in the final image.

Make sure that all light sources that you will be using during your shot are switched off while you meter the exposure—otherwise you will end up using too short a shutter speed. It is also a good idea to practice using your camera's menus and controls in the dark before heading out on a shoot.

Off into the Night!

So, now you've set your camera up and you know how to use it in the dark? Then let's go!

The first problem you will probably encounter is your camera's inability to autofocus in the dark. This is not critical if you are using medium or small apertures, but can be a serious problem for wider aperture settings. Aperture settings vary constantly on night shoots (for example, if a cloud unexpectedly covers the moon) and the resulting focus shift can spoil the final result.

You can work around this problem by using one of your flashlights (which you will be carrying anyway) to shine into the camera's lens from the appropriate distance while it focuses. You can also use a flash gun's focus assist lamp to help your camera focus. You can, of course, focus manually, and your eyes are still probably more reliable than the electronics built into even the most sophisticated camera, especially at night.

The more complex your planned shot, the more difficult it becomes to retain an overview of work in progress. It often helps to use unobtrusive orientation markers that are either not clearly visible or which can be easily retouched out of the final image. A few strategically placed matches or stones can help a great deal.

Campfire light writing: f/4.5, 20 seconds at ISO 500

If your light trails at first appear too bright or too dark, you can adjust the speed of movement of your light source accordingly: slower moving lights appear brighter than faster moving lights in the final image. Light sources can also appear too dark if they are not pointed directly at the camera while writing. Here too, a little practice can help you to find out exactly how to move during a shot. Experience has also shown that an exposure compensation value of between +1/3 and +1 EV also helps to produce balanced

images in which the image elements that are lit by your writing lights are also well exposed. If you are writing letters or numbers, these will usually appear mirrored in the final image. If you can't flip your image later because the background includes elements that cannot be reversed, simply turn your back to the camera, hold your writing lamp over your shoulder and write normally—your words will then be correctly oriented in the final image.

Sometimes a light writing group can become unmotivated during a shoot. If this should happen, it helps to provide enough food and drink, let everybody see how the work is progressing, and let everyone involved take part in discussing how to proceed. These are simple measures but can work wonders during a long session.

So, all that remains is for me to wish you a load of fun and good luck writing with light!

Useful links and sources:

- http://www.pearl.de/c-5630.shtml – cheap LED lamps
- http://www.elektronik-kompendium.de/ – circuit diagrams and electronic component sources
- http://www.lapp-pro.de/ – Light writer web site
- http://www.lichtfaktor.eu – Light writer blog with announcements and dates covering all aspects of light writing
- http://vimeo.com/channels/lightwriting – light writing videos
- eBay search for "sample color filter"

The Earth from Above

Kite Aerial Photography

Michael & Karen McAllister

Kite aerial photography (also referred to as KAP) provides a unique way to photograph the world from above at heights only limited to the length of your line. With the proper equipment and a nice breeze your camera will gently lift into the air for a smooth ride, resulting in an array of fun, interesting, and detailed photographs. Kite aerial photography is a low-cost alternative to conventional airplane and helicopter aerial photography, and it also allows for lower elevation detail.

The first kite aerial photograph dates back to 1888, and is credited to a French farmer and inventor, Arthur Batut. Kites were then utilized into the early 1900s to take aerial photographs for many different purposes, including military reconnaissance, disaster assessment, scientific surveys, and more.

In 1906, photographer George Lawrence succeeded in suspending his 49-pound hand-built panoramic camera high in the air above San Francisco by using a connected chain of Conyne Kites flown from a ship in San Francisco Bay. The result was a phenomenal photograph titled "San Francisco in Ruins". This amazing photograph provides a very unique perspective of the widespread destruction caused by the great earthquake which occurred just weeks before.

By the 1930s, the development of powered flight gradually brought an end to the golden age of kite aerial photography. However, during the past few decades KAP has experienced a renaissance, especially with the development of high-quality, low-cost, and lightweight digital cameras.

There are three basic components to kite aerial photography:

1. The kite
2. The camera
3. A special rig that attaches the camera to the kite line and activates the shutter

Kite aerial photograph: George Lawrence, "San Francisco in Ruins", 1906, Library of Congress.
http://earthquake.usgs.gov/regional/nca/1906/kap/lawrence.php

A variety of cameras can be used for KAP. The camera is attached to a rig that hangs from the kite line, not the kite itself. Your camera will be quite a distance from you at times as your kite travels higher, but there are a number of ways to trigger the shutter. These systems can range from simple to complex. The more expensive systems can offer a wider variety of control over the operation of the camera, including pan and tilt controls, video downlink, as well as shutter and zoom controls. This chapter will provide an introduction and overview of kite aerial photography, including resources for additional information, supplies, kits, and equipment.

Kites

There are several different kite styles that work well for kite aerial photography. All of the kites mentioned and corresponding accessories are easily ordered through online kite stores. Note the differing wind conditions for the kites listed.

The Flowform Kite

The Flowform style of kite is preferred due to its ease of deployment. There are no bars or assembly: simply unfold the kite and the wind will lift it into the air. However, it does require more of a breeze than

Santa Barbara Marina - Pentax Optio A20

Santa Barbara Breakwater - Pentax Optio A20

the other kites for a successful flight. The smaller Flowform 16 is great for winds ranging from 15 to 30 mph. The larger Flowform 30 is a good choice for winds of 8 to 20 mph. Some people attach a tail for added stability, normally using what's called a "fuzzy tail".

The Delta and the Delta Conyne Kite

Delta kites are great for low to medium winds. The larger Delta kites are a efficient option for kite photography. Kites with a wing-span of 9 1/2 feet, 10 feet, or 11 feet are ideal for wind conditions of 5 to 20 mph.

The Rokkaku Kite

The Rokkaku is a six-sided kite based on a traditional Japanese design. Size 6' x 5' is great for winds of 5 to 15 mph. The Giant Rokkaku (7.5' x 6' and larger) will develop great pull in very light

A Flowform kite

A Dopero kite

wind, and should not be used in winds of 10 mph or greater. This is a favorite kite for light wind situations. A "streamer tail" can be added for increased stability.

The Dopero Kite

The Dopero is another large kite, normally custom made, great for very low wind conditions of 4 to 12 mph. However, this kite requires more assembly time than the others.

Kites continued... Line and Accessories

When purchasing a kite, you will also purchase the kite string and a spool (sometimes referred to as a hoop, or winder). The line is available in different strengths and sizes. Be sure to purchase the correct line poundage indicated for your kite: usually 180 pound to 250 pound is recommended. You can also choose the length of your line, normally 500' or 1000', along with the corresponding hoop size to hold your line.

An optional accessory is a snap swivel (rated the same poundage as your line). Secure the swivel to the end of the line on your spool by using a Double Larks Head Knot. This will create a fast and easy way to attach the line to your kite, or simply use the same knot to connect the line directly to your kite, which usually has a ring attached for this purpose. Gloves are another optional but recommended accessory, along with an anemometer to check wind speed.

There's a delicate balance between just enough and too much wind. Use a big kite in too powerful of a wind and you might find yourself being dragged along the ground. Use a small kite in a light breeze and your kite and camera may drop to the ground. As time goes on, you may end up owning several kites, each for a different wind condition. Take the time to learn how to fly a kite safely.

More on Kite Safety

- FAA Regulations state that no person may operate a kite in a manor that creates a hazard to persons, property, or aircraft.
- Stay well away from airports and their flight paths.
- Consult FAA regulations or your country's rules of the air for details.
- Never fly over or near power lines, cables, radio towers, or similar hazards.
- Never fly in strong wind conditions (wet line is conductive).
- Never fly over roads or vehicles.
- Remember that you are always responsible for your kite and its line.

Cameras

Lightweight point-and-shoot cameras are quite popular for kite aerial photography. Models and prices will vary but the compact size of these modes will work well for light wind days.

SLR cameras also work quite well for KAP. A larger rig is required to accommodate the camera, and is usually controlled from the ground via a remote control transmitter, most often used for model airplanes.

Eventually, you may want to use a camera that can accept a variety of lenses, including a super wide-angle lens or a fisheye lens for special effects.

Shutter Control Options

A camera with a remote control sensor is an effective choice, as it will have multiple options available that will trigger the shutter. However, it is not impossible to build a rig with a mechanical trigger that actually presses the shutter button via a remote control. Check your camera's menu for remote control options. It may be

necessary to set your camera's drive mode to "remote control" which will enable complete control with your RC device. As you explore your camera's features, you may discover that you have an "Interval Time Mode" option. Simply set the time desired and launch your camera–no remote control required!

The Camera Rig

Rigs, sometimes called cradles, can vary in size and complexity and can be built to accommodate a range of cameras. The simplest design is a basic box style that holds the camera in a set position to take photographs at predetermined intervals. The photographer positions the camera's angle manually prior to flight. The camera is triggered by either a battery-powered infrared LED, your camera's own interval time mode, or an intervalometer which is positioned in front of the camera's remote control sensor. More sophisticated rigs can pan and tilt your camera, take photos on command by radio-control, and also transmit a live view to the photographer on the ground via a video downlink. The style of rig you choose is determined by the camera you're going to use and by the amount of time, effort, and money you want to invest. Rigs, kits, and supplies are available online through kite aerial photography specialty stores.

Point-and-Shoot Cameras

A simple rig to carry a point-and-shoot camera is called a "beak", which is lightweight and can be used with any of the kites mentioned. The beak will carry your camera at a predetermined angle. Several beak styles are available, including one that will rotate your camera by 10 degrees after each photo, providing a full 360 panorama from the air. Note: Your camera must have a remote control sensor to use this option.

Kits and supplies available through:

www.Brooxes.com (downloadable instructions available)

www.KapShop.com

Kits, complete KAP packages, and fully assembled rigs with remote control are available at:

www.CobraKite.com/KAP (camera not included in kits)

SLR Cameras

Rigs for SLR cameras can also range from simple to complex, and are usually designed for the smaller camera such as the Canon Rebel series; the Nikon Coolpix 8400; Nikon D40, D50, and D60; or the Olympus Evolt E-500. You can purchase or build a simple box style frame and add the basics needed to automatically trigger the shutter, or choose a more complex rig controlled from the ground by remote control.

Kits and supplies available through:

www.Brooxes.com (downloadable instructions available)

www.KapShop.com

Kits, complete KAP packages, and fully assembled rigs with remote control are available at:

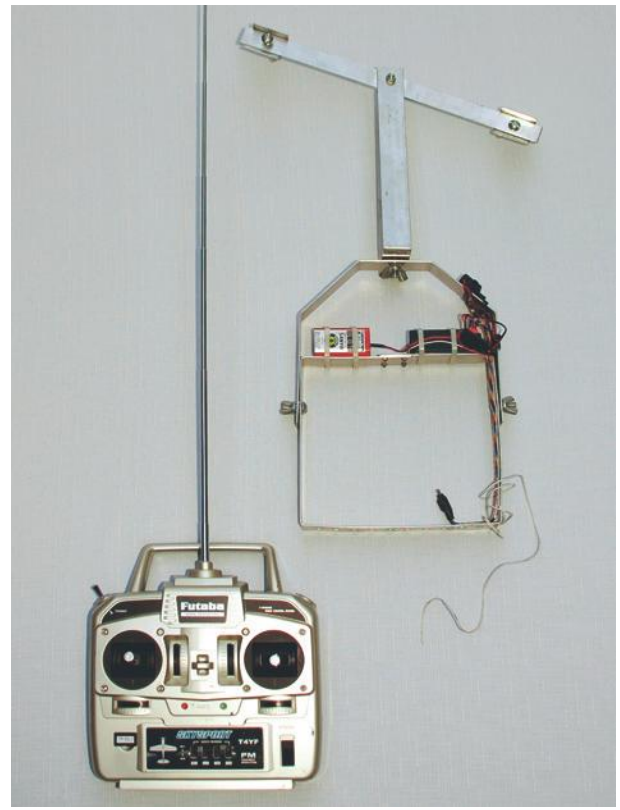
www.CobraKite.com/KAP (camera not included in kits)

The Picavet

A few camera rigs will attach directly to the kite line; however, most rigs hang from the line by using a "picavet" suspension system. The picavet (pronounced "pick-a-vay") allows your camera to remain level even though the kite string is not, providing a gentle flowing ride for your rig and camera. There are two ends to a picavet, each attached to the kite line, but not close together: the camera rig hangs from the middle. As the line of the kite

Basic KAP Rig with a Nikon Coolpix 8400.

moves at different angles the picavet provides a level glide for the camera and rig. Picavets can also be simple or complex, but a basic picavet is normally included with the kit that you purchase, or you can purchase the parts to make your own. Once you have all of your equipment ready, test your rig and camera on the ground first to be sure everything is operational.



This is our first KAP rig. It's a very basic box style, but still works well and is very light weight: a simple design that holds a battery, a receiver, and an infrared LED to trigger the shutter, operated from the ground by remote control. The small wire at the lower right, next to the IR LED, works as an antenna, and the straight bar at the top clamps directly onto the kite line. You don't need a fancy or expensive rig to obtain great results: we've captured some wonderful photos with this simple, efficient rig.

.

The same basic rig with a Nikon Coolpix 8400 and a fisheye lens.

KAP rigs can be more complex, with adjustable pan and tilt controls that are operated from the ground via a remote control. Kit purchased at: Brooxes.com

Launch your kite and let it settle at an elevation of anywhere from 75 to 150 feet. Attach your rig to the line, then dole out more line to attain the elevation desired. Be ready in case the wind should stop blowing! If this happens, quickly reel in your line while running into the wind so your camera will stay afloat until you (or a friend) can catch it! Otherwise, if you have the right wind/kite combination your camera should stay aloft for as long as you like. However, when your batteries and memory card are exhausted it's now time to retrieve your camera.

It's quite exciting to browse through the photos to see what you've captured! You will find that some are not quite in focus, but there will be a few great photos in there as well.

There will be a few people that think you're crazy to attach an expensive camera to a kite. Just show them your photos and they might start to understand!

A modified "beak" rig with Pentax Optio A20 camera carried by a basic picavet suspension system.
Kits available at: Brooxes.com

There is so much enjoyment in kite aerial photography: the pleasure of flying a kite; the thrill of unexpected and sometimes remarkable images; participating in a very unique style of landscape photography; and the camaraderie of a small yet international community of "kappers".

Arizona House and Surroundings - Nikon Coolpix 8400. Note the line from the kite to the photographer on the ground. To avoid the line in the photo, simply turn your camera in the opposite direction and position yourself on the far side of the subject.

Be safe and have fun!

Kite Aerial Photography Online Resources

- KapShop.com
- Brooxes.com
- CobraKite.com/KAP
- Gentles.info
- Gentles.ltd.uk
- Harbortronics.com
- KAPspot.com

- KitesRus.com
- WindpowerSports.com
- Kitestore.net
- Blowinginthewind.com
- GoFlyaKite.com
- intothewind.com
- HighlineKites.com

- ScottHaefner.com/kap
- KAP-Man.de
- Mkary.de
- Kaping.info
- Birdseye.be
- Kap.toadstone.com
- Kaper.us

Selective Focus

Build Your Own Tilt/Shift Lens

Cyrill Harnischmacher

Tilting a photographic lens allows you to change the orientation of the plane of focus in such a way that you can simultaneously capture close and distant objects in sharp focus—an effect known as the Scheimpflug Principle. This technique is often used in product photography to keep large objects completely in focus. You can, however, also use the idea creatively in conjunction with a wide open aperture to strategically place objects and image elements on the plane of focus. The resulting images often have a painterly quality and use the appeal of deliberate blur to achieve their effects.

This effect is especially noticeable for distant objects, and the extremely shallow depth of field makes real landscapes appear more like miniature models. This unusual depth of field behavior causes the brain to interpret what it sees as a macro photo and, because the evidence appears to be conclusive (and because we like what we are seeing), we accept the false impression as real.

These types of effects are usually produced using specialized tilt/shift lenses, but there are also other, cheaper ways of achieving similar results. You will need a DSLR (that we are not going to modify!) and an old medium format bellows camera from the fifties or sixties that you are happy to take apart. An old camera is fine as long as the shutter works and the bellows are light tight. We need to use a larger format lens in order to illuminate the entire sensor while tilting the lens.

Modifying the Lens

We first have to separate the lens and its bellows from the camera (here, an Adox Golf) and glue it to a square 6 x 6 cm polystyrene sheet with a 44 mm hole cut in its center. This assembly is then attached to the camera using an appropriate T2 adapter. You can also use a spacer ring or an old, low-power teleconverter that allows the lens to focus to infinity.

Another cheap alternative is to cut an appropriate hole in the lens cap from your DSLR and to use that as a mount for the bellows lens. Check that your new lens unit fits your camera properly before gluing it together. A piece of wire covered with foam rubber helps fix the lens unit to the camera and prevents it from tipping forward. The measurements listed here apply to the Adox Golf bellows already mentioned and a Nikon-compatible T2 adapter, but can vary for other cameras and lenses. A standard two-part adhesive

More than fifty years of photographic history combined in a single unit. The lens attached to this modern DSLR comes from an Adox Golf camera built in the fifties.

The deliberately shallow depth of focus makes this train look like part of a model railway.

is best for gluing the parts together. The final step involves fixing the shutter in an open position by inserting a small screw into the cable release mount on the lens. Now we can start shooting.

Shoot Intuitively

You can adjust focus by moving the lens back and forth, and the unit is even macro-capable at its full bellows extension. If your camera is capable of metering with non-electronic lenses, you can usually use the exposure values it calculates in aperture-priority mode to take effective photos. Automatic metering usually becomes unreliable only if you use extreme tilt movements. If your camera only supports electronic lenses, you will have to use manual ("M") mode and select the shutter speed yourself. This is a little less convenient, but you will quickly learn to judge the length of the required exposure. You will quickly learn to estimate the partial focus effects caused by different degrees of lens tilt, and the effect is immediately visible in the viewfinder anyway. You can also regulate the degree of softness in your image by adjusting the aperture in the lens, although closing the aperture down would cancel out the narrow focus effects we are trying to achieve. There is no way to select specific settings in the lens, so you have to work intuitively. Most tilt/shift images have to be sharpened and color-

Here, the plane of focus covers the foreground, the actual subject, and the background.

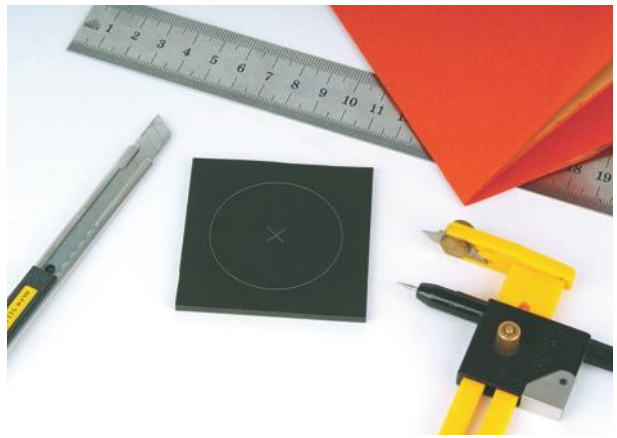
The intersections between sharp and unsharp image areas produce almost painterly effects.

corrected on a computer anyway, due to the imprecise metering and the often dull look of the uncorrected images.

Cleaning the Lens

The adapter side of our homemade lens unit is open to the air, and the regular "pump" movements of the bellows tend to blow a fair amount of dust onto the camera's sensor. I recommend that you clean the inside of the bellows using a cheap blower brush before mounting it on your camera and that you clean the sensor again before mounting a regular lens.

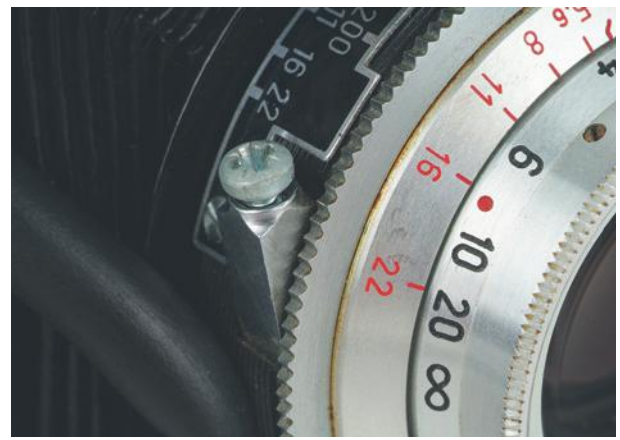
This type of "home-made" camera often attracts attention, but usually from people who are genuinely interested in off-beat photography. So get out there and have fun photographing the world from your new, selective focus viewpoint.



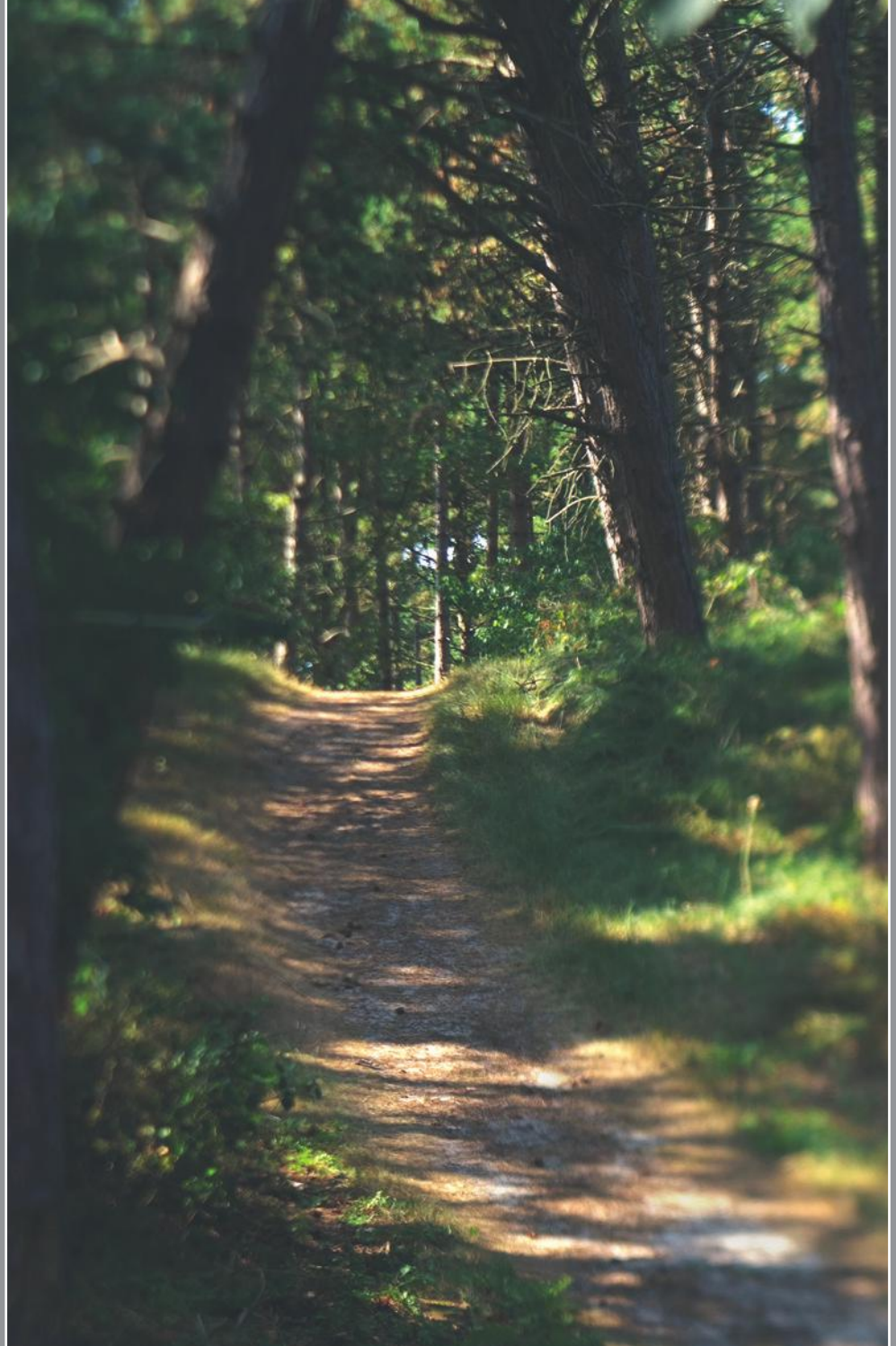
Cut a 44 mm hole in a 6 x 6 cm polystyrene sheet and smooth the edges off using fine sandpaper.

Glue the lens/bellows assembly to the front of the polystyrene sheet, making sure that the seam is light tight.

The T2 adapter is glued to the back of the polystyrene sheet.

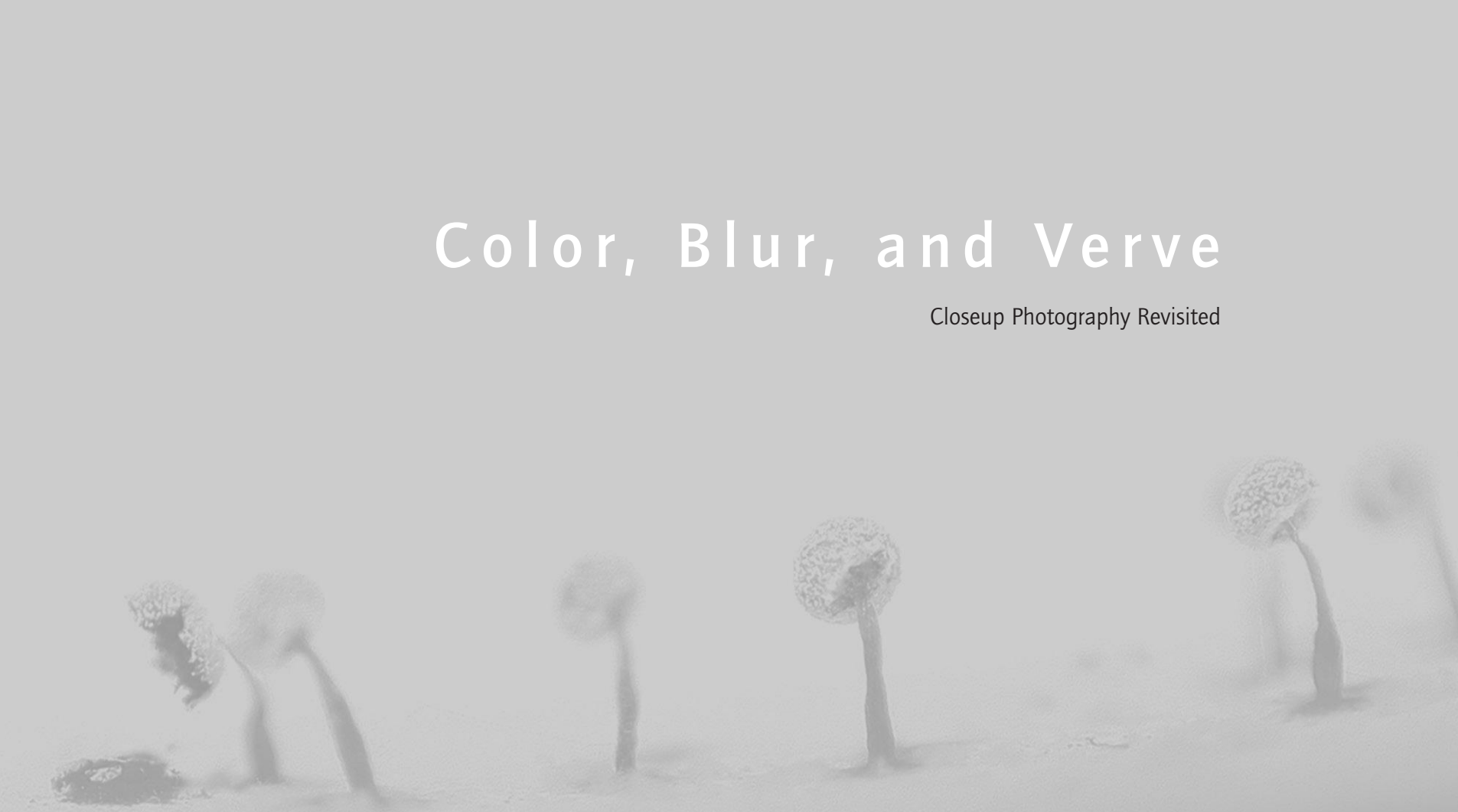


Fix the shutter in the open position by inserting a long, thin screw into the cable release socket.



Color, Blur, and Verve

Closeup Photography Revisited



Anett Boettcher

I have always taken a lot of photos, but my real passion for photography started when I purchased my first digital camera. Since then, I snap just about everything I see on my search for the perfect image and that certain "wow" factor. I photograph things that aren't always visible at first glance, and I regularly manage to amaze people with the results. The simplest things often end up looking completely different than normal, and it is exciting to see just what forms everyday objects take on when you take a second look. I am always really excited when I load my images onto my computer for processing—dial in some color and up with the contrast! Photography helps me keep my life in balance and stimulates my inquisitive nature, while giving me a thrill too.

The Search for Ideas

I find my subjects spontaneously in everyday situations, and ideas quickly turn into a trial shoot, or often a full-blown session. I might dig out a pocket flashlight and some plasticine in the middle of the night, and then spend a couple of hours taking photos. Spontaneity is an important stimulus in my work.

Technique

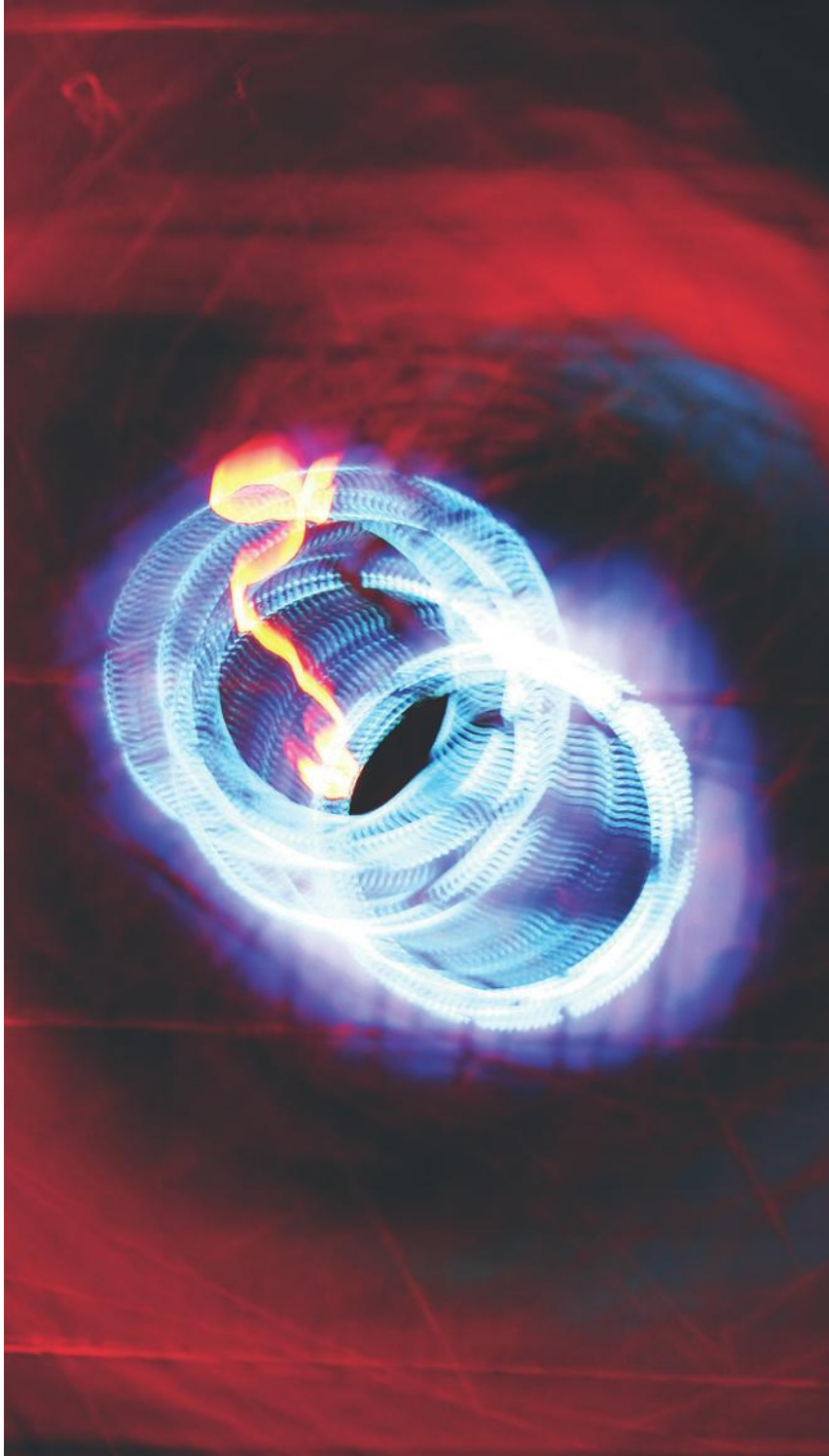
I use a Canon EOS 40D with a collection of Canon lenses, various adapters, and even a couple of old M42 lenses. I like to use manual lenses to help me improvise. Once I have an idea, I have to get to work without thinking for too long about what to do next. I either grab my camera immediately, or take notes to help me realize my idea later. My aim is always to fascinate people and to get them to think twice about what they are seeing. Most of my images are of unique moments, and I like to take many different pictures of the same object under different circumstances. I usually focus manually when I am shooting macro images, and I often use a tripod—although a tripod sometimes simply gets in the way. The

freedom of expression that shooting handheld gives me is an important factor in my work, and I often select a higher ISO value in order to preserve that freedom. Sometimes, there is no time to set up a tripod anyway.

I like to experiment with different combinations of camera settings and positions, which helps me find new ways of seeing things. It is intriguing to see how small changes produce completely new images. My curiosity and my open eyes form the basis of my photographic work, although a fast computer with Photoshop is essential too. I don't use any particular Photoshop techniques. I always try to bring out the best in an image by increasing saturation and contrast, or by experimenting with color. The resulting images are intended to get the viewer to take a second look and to consider his or her surroundings from a different viewpoint.

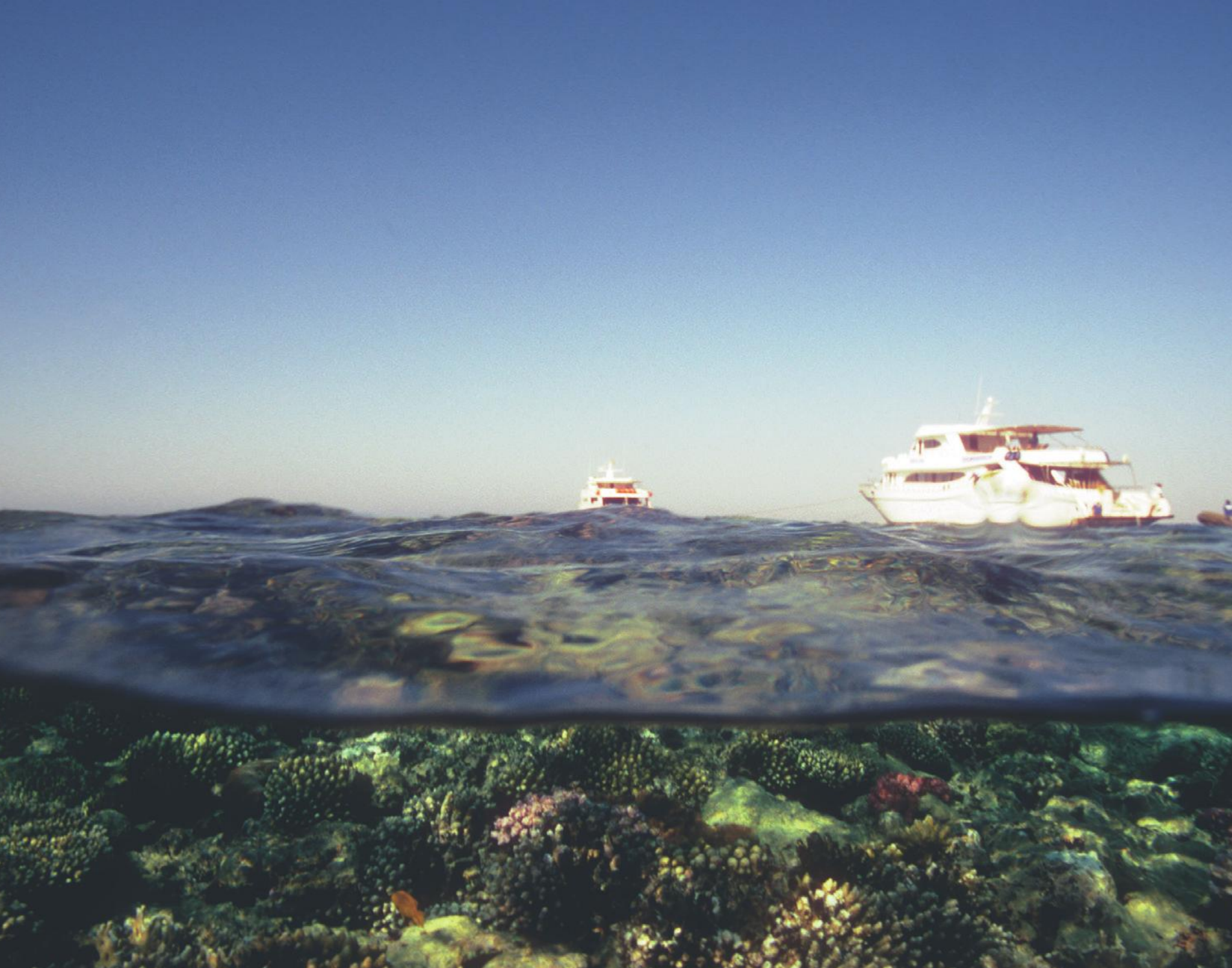
Left: Partially frozen water
Right: Garden heater

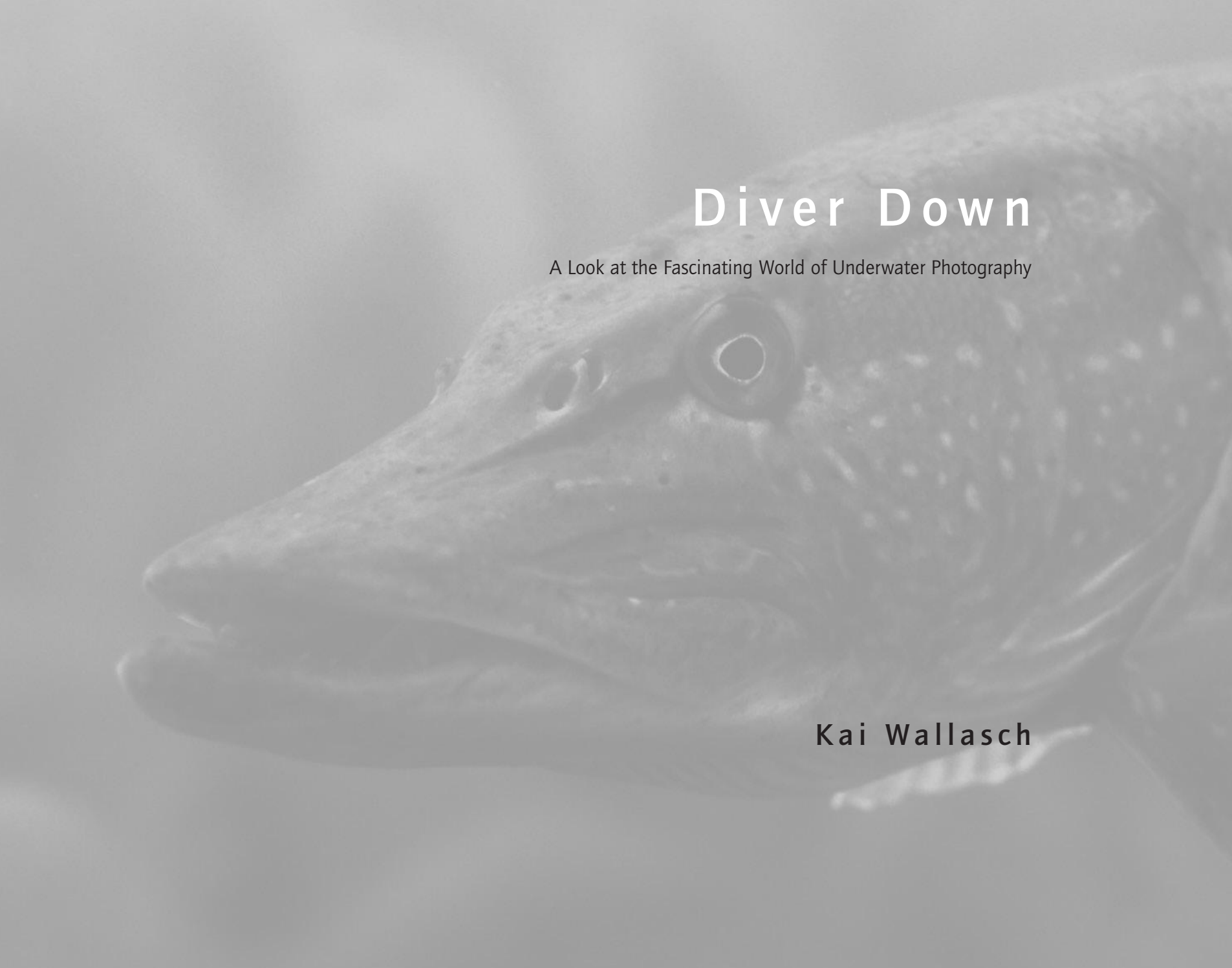
Overleaf left: Dew on leaves
Overleaf right: Fungus mold



Left: Experiment with moving light sources

Right: Log fire





Diver Down

A Look at the Fascinating World of Underwater Photography

Kai Wallasch

Taking photos in and under water offers a new and fascinating way to view bizarre and often previously unknown subjects, while photographing familiar objects from the water guarantees you a new and exciting viewpoint. Whether you are vacation diving in the Caribbean, paddling your canoe, or just out for a swim at an outdoor pool, it is exciting to record and share your experiences.

First Steps

It is important to remember from the start that taking photos around water presents difficulties that do not plague other photographers. First and foremost: water spells instant death for sensitive electronic camera components—and I am speaking from painful experience here—so it is extremely important to protect your gear while keeping the basic controls and, of course, the shutter release accessible. The other important thing to remember is that water guzzles light and color with astonishing quickness as the depth increases. Absorption of light makes the differences between most colors invisible at a depth of just a few meters and, without the use of a separate light source, the entire underwater world appears in dull blue/gray tones.

Automatic exposure systems designed for use on dry land often can't cope with the mixed-source and backlit situations that occur underwater, making manual settings no longer a luxury, but a necessity. The aperture you select governs not only depth of field, but also the overall brightness (and therefore the visibility of individual details) in an image. Practical use of white balance settings or gray cards is also very difficult underwater, so using bracketing sequences, combined with your own increasing experience, is the best way to ensure solid results.

Sources of Light

The sun is still the best source of light for taking photographs, and no other light can illuminate a subject as brightly or as evenly. The higher the sun in the sky and the clearer the water, the better your results will be. But, at depths of ten meters and more, the sun simply isn't bright enough to bring out the fantastic colors in a reef. If you want to reproduce the colors you see (black-and-white can produce pleasing results too), an accessory flash is the best solution. Flash has to be powerful enough to send light to your subject and reflect it back to the camera. Most built-in flash units simply aren't up to the job. Positioning your flash is just as important underwater as on land. The farther you position your flash from the lens axis, the less likely it is that reflections from particles and microorganisms in the water will cause exposure errors. Professional underwater photographers often use two flash units mounted on long brackets to ensure that their images are adequately and evenly lit. A quick and easy alternative to complex flash units is to use a gas-discharge diver's flashlight to light your subject. Fortunately, the color temperature of this type of flashlight is well suited to underwater photography.

Underwater Camera Housings and Waterproof Compacts

Most hobby photographers own one or more digital compacts that can be easily mounted in a cheap, clear plastic waterproof housing. As an alternative, you can also choose from the increasing number of efficient waterproof cameras that are hitting the market nowadays. This helps to avoid the sudden and irreversible death by drowning of your favorite DSLR which, experience shows, is sure to happen sooner or later. Waterproof compacts are great for snapshots, experiments, or short underwater films, and are usually watertight to depths of about 3 meters. The major drawback of this type of camera is the lack of an external flash shoe for attaching

A diver pictured at a partially flash-lit reef. An accessory flash was used to light the foreground and to show the true colors of the reef and its inhabitants. The farther the objects in the image from the camera, the weaker their colors become due to the absorption of light waves by the water.

the accessory lights that are often necessary for shooting well-lit underwater images.

The Nikonos V

This analog underwater camera is not particularly easy to use, but is available quite cheaply on the second-hand market along with a wide range of dedicated accessories. The camera's rangefinder-type construction makes it difficult to aim precisely, but a special framer device can help to judge focusing distances when shooting close-ups, and there is also a special accessory viewfinder available for wide-angle photography.

A Nikonos V fitted with a wide-angle lens and an accessory viewfinder

ewa-marine

A value alternative to a specialized camera is a universal soft plastic camera housing such as those manufactured by ewa-marine. This type of housing usually has a built-in waterproof glove, allowing you to handle your camera exactly as you would on land. Some models also have space for mounting an accessory flash. ewa-marine housings can be used at depths of between 20 and 50 meters and are also a fine way to protect your camera if you are kayaking, sailing, or shooting photos of other water sports.

Hard Plastic Housings

The best type of camera to use is an SLR with its own dedicated underwater housing. Analog SLR underwater housings are often quite cheap if you can find them second-hand, while a custom built aluminum or carbon housing with openings for the controls of a specific camera model can cost significantly more than the camera itself. Additional costs are also involved in purchasing custom lens housings or "ports". For professional underwater photographers, image quality, system flexibility, and the ability to use specialized macro and fisheye lenses are more important than price considerations.

A Nikon D200 with accessory flash in an ewa-marine housing

A Nikon F100 and flash in a Hugyfot housing fitted with a separate lens port

The camera controls are manipulated using custom levers, which usually means you will have to buy a new housing if you change your camera.

To be able to use different lenses, various "ports" are necessary.

Nikonos RS

The Nikonos RS is a unique, amphibious autofocus system SLR built by Nikon between 1992 and 1997. This camera is only available second-hand, if you can find one at all.

Periscopes and Other Shooting Aids

You can use a periscope and a waterproof flashlight to take photographs at shallow depths without even getting wet, and an even simpler way to produce an interesting underwater perspective is to shoot from within a small fish tank placed in the water. Our example shows a toy periscope that we customized for use with a camera. We sealed the glass at the underwater end with transparent silicone and used a hose clamp and a simple metal bracket from a do-it-yourself store to fix the camera to the top end. The bracket even had a hole already cut in it that was the correct size for a tripod screw. Because light from the subject has to cover the entire additional distance through the periscope, the camera assumes that the subject is farther away than it really is, making it necessary to select either a wider aperture on the camera or closer zoom setting on the flash. If you use a periscope like this one, you will often end up photographing part of the inside of the periscope, but you can crop unwanted details out of the final image later. If the temperature difference between the water and the air causes water to condense inside the periscope, drilling a small ventilation hole at the top of the tube can help.

Another alternative way to shoot underwater is to attach a waterproof compact to a monopod, hold it under the water's surface, and shoot using the self-timer or a long cable release. This is a great way to "get wet" in nature reserves where diving is not allowed, or where a fine, sandy riverbed makes it impossible to

A digital compact attached to a periscope

Close to the water's edge, you can use a periscope to take underwater snaps without actually getting wet.

move in the water without stirring up clouds of dirt. You can use this type of setup to photograph under the ice in winter as well.

Half and half—The Best of Both Worlds

Shots that simultaneously show a scene above and below the waterline have their own special charm, combining a normal everyday view with objects outside of our daily experience. This type of shot is best taken using a wide-angle or even a fisheye lens. Here, the sun is our light source of choice, as we will be shooting near the surface and because super-wide-angle lenses cover a wider angle of view than most flash systems can cover anyway. The

A split level fisheye shot. Shots like these underscore the dangers of jumping into unknown waters.

A lion fish in an aquarium. I used a rubber sun shade to prevent reflections from the aquarium's glass from spoiling the shot.

water should be as clear as possible, making mountain lakes, clear rivers, or the southern ocean the best places to make half-and-half images.

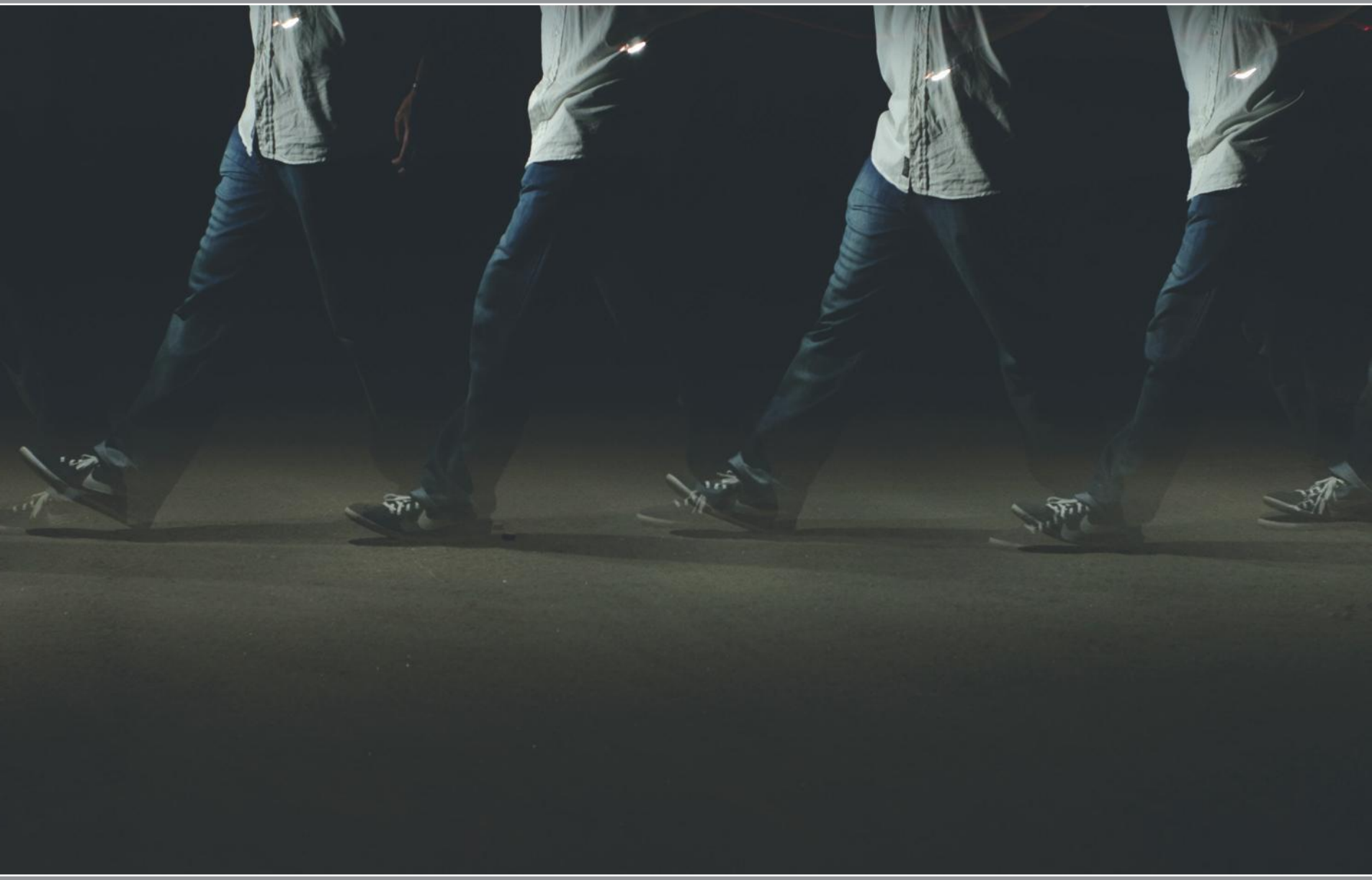
Photographing Fish in Aquaria

If you don't want to travel too far but still want to take pictures of a clownfish or a barracuda, you can always visit the aquarium at your nearest zoo. The use of flash in zoo aquaria is usually prohibited, so you will need to select a high ISO value and a short shutter speed in order to get acceptable results. Fish in captivity are usually not as skittish as fish in the wild, and they can't swim far anyway. The most important thing to remember is not to shoot at an angle to the front wall of the aquarium in order to avoid unwanted reflections. A polarizing filter and careful use of a lens cleaning cloth help to reduce reflections too. You can also use a rubber lens shade pressed directly onto the aquarium's glass to avoid stray light getting into your shot. A tripod will help you to avoid camera shake while using long shutter speeds, but these are only really useful for still or slow-moving fish. A great way to capture an image of a fish is to manually prefocus on a particular area within the aquarium and simply wait for your fish to move into position. Some cameras can be set up to release the shutter automatically if an object moves into a preset focus area, which can also be a great way to bag that elusive fish shot. Whether you use a cheap compact or a DSLR with a specialized lens, a little patience can be rewarded with photos that are just as appealing as any shot in the wild.

For safety's sake, you should take a diving course from a qualified instructor before venturing into the world of underwater photography. This shot was taken using an SLR in a flexible plastic housing.

For Serious Underwater Photographers

You will need to take a proper scuba-diving course if you are serious about taking great underwater photos. This is the only way to get sufficient time close enough to your subject to capture the right shot, and you will only be able to concentrate properly on taking photos once handling your diving equipment has become instinctive. A good place to start is Global Underwater Explorers at www.gue.com.



Night Sights

Using Flash Creatively in the Dark

Michael Diechtierow

In order to take photos we need light, either from the sun or an artificial source. We cannot influence natural light sources, so we photographers have to make do with the light that is available, especially if we want to shoot moody images at dusk. Things look very different if we use flash to light up the night. Here, we can determine exactly what we light, where, and how brightly. We can also decide how bright to make the foreground or background by altering the aperture or the shutter speed. And we can even use timed exposures to make objects appear multiple times in a single image. So you see, using flash at night helps us to create new and fascinating images, but remains a challenge that uses techniques very different from the "classic" approach to photography that we are used to.

This piece is aimed at introducing you to nighttime flash techniques and intends to give you the knowledge you need to start experimenting on your own.

Cameras and Lenses

For the best results, your camera should be capable of manual shutter speeds of one second or longer, and should produce low noise in low light situations and at high ISO values (ISO 400 and above). Additionally, your lens should have a large maximum aperture.

You will need to set the aperture and the shutter speed manually in order to control the brightness of the flash and the background (non-flash) light in your image. Cameras without long shutter speeds are not suitable for our purposes, as we need time to execute the shot while the shutter is open. Noise at high ISO values and for long exposure times is a problem caused by the small CCD chips built into many compact digital cameras, so either an analog or a digital SLR is a better choice. A digital camera allows you to review your results immediately and make any necessary changes to your composition and your camera settings before proceeding. This is an enormous advantage when you are taking nighttime flash photos, as the results are often difficult to predict.

The Flash Unit

You can use just about any flash unit, but it should have:

- manually adjustable flash output
- a display that can be illuminated for working in the dark

Manually adjustable flash output is more important than the maximum output level, and less powerful flash units can be just as useful if you are shooting with a bright (i.e., large-aperture) lens. The images shown here were shot using a Nikon Speedlight SB-600 flash.

Tripods

A tripod is generally indispensable when you are shooting in low (or no) light, although in this chapter are some examples of hand-held shots. A tripod's main function is to provide a solid, shake-free base for your camera, and the heavier and more flexible it is, the better.

Techniques

One of the basic characteristics of night flash shots is that the photographer must provide some of the light that contributes to the look of the final image. This fact gives us almost endless possibilities for composing our images. The following two sections provide some examples.

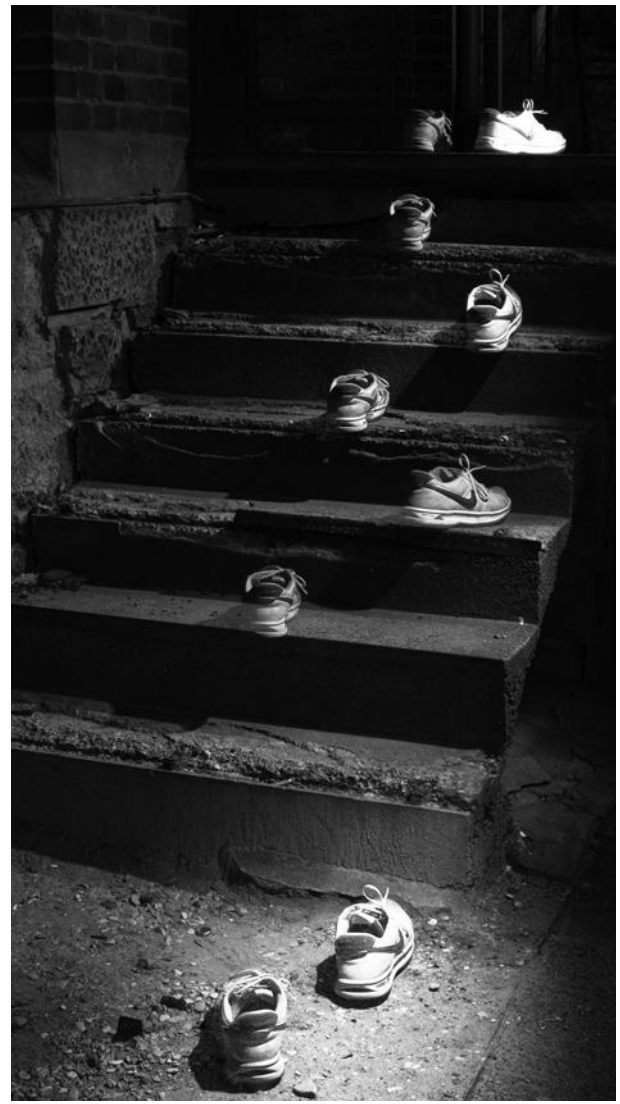
Timed Multiple Exposure

The basis of this technique is a long exposure time during which an object is lit several times from different viewpoints. The background for shots like this can form part of the composition (either static or blurred) but doesn't necessarily have to appear at all. The aperture and shutter speed settings depend on the lighting conditions and the effects you want to achieve.

Previous page left: Apart from the flash, this shot included no other light sources, making it simple to use a long exposure. The shot was made handheld and the flash was fired six times while the subject walked through the frame. The six ultra-short exposures during the long main exposure make the subject appear sharp and shake-free. This shot was made using a Nikon D300 with a 50 mm lens set to f/6.3. The exposure time was 8 seconds at ISO 200. I used a Nikon SB-600 flash fired at 1/16 power. This technique is often used by nature photographers to capture images of moths or bats.

In order to shoot the sneaker image, I used a weak background light and stopped the aperture down in order to keep the exposure time long. I fired the flash once to capture the background detail, followed by multiple flashes to capture the shoes in their various positions. I had an exposure time of exactly 30 seconds to arrange and shoot the entire scene. A tripod is essential for this type of shot, with its static background.

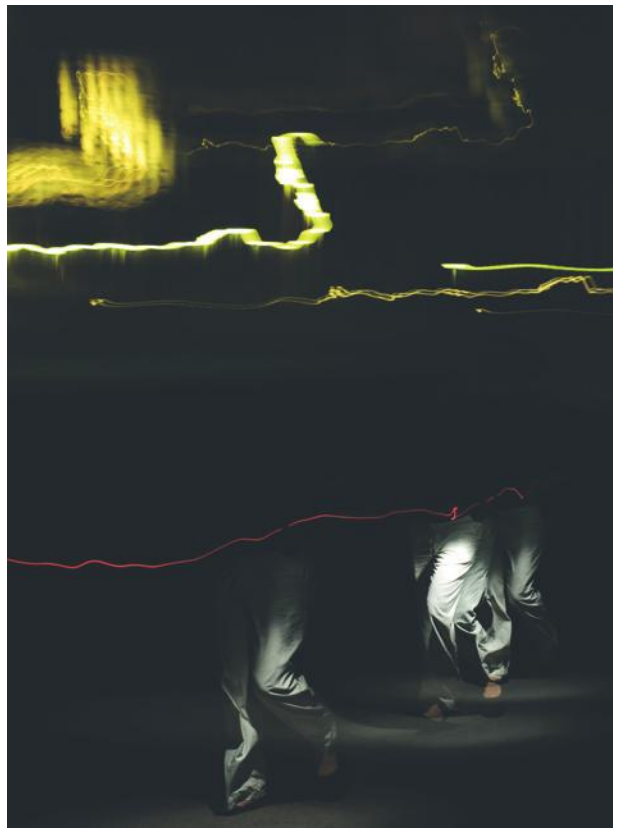
The next image was a little more experimental and was shot handheld in spite of the available light, causing the yellow patterns you can see in the background. The red ready light on the flash unit formed a red line through the whole image, and the objects in sharp focus beneath the red line were captured by the light from the flash.



Nikon D300, 35mm lens at f/18, 30 seconds at ISO 100. Nikon SB-600 flash fired at 1/2 power.

Fill Flash

Fill flash is used either to brighten detail in darker parts of an image, or to provide "extra" detail light in addition to the available light. The first example is the result of a long exposure during which I brightened the rails in the foreground using fill flash. The effect is subtle, but improved foreground detail noticeably.



Nikon D300, 50mm lens set to f/9, 8 seconds at ISO 200. Nikon SB-600 fired at 1/8 power.

At right, the tree was lit by a lateral flash which brightened the tree and the grass surrounding it. There was still a fair amount of ambient light in the scene, so I had to stop down and use a fairly short exposure in order to get the background brightness right.

There was virtually no available light in this scene of a forest hut, at far right, making a long exposure necessary to preserve foreground and background detail. The interior of the hut was completely dark until I fired the flash. This example shows how altering the lighting can create a completely different feel within a scene. Experience has also shown that it is much easier to light closed forms (such as the hut) than it is to light objects in the open, where a large portion of the flash light either lights the background or simply disappears into the surrounding darkness.

Nikon D300, 48 mm focal length at f/8, 10 seconds at ISO 320. Nikon SB-600 fired at 1/2 power.

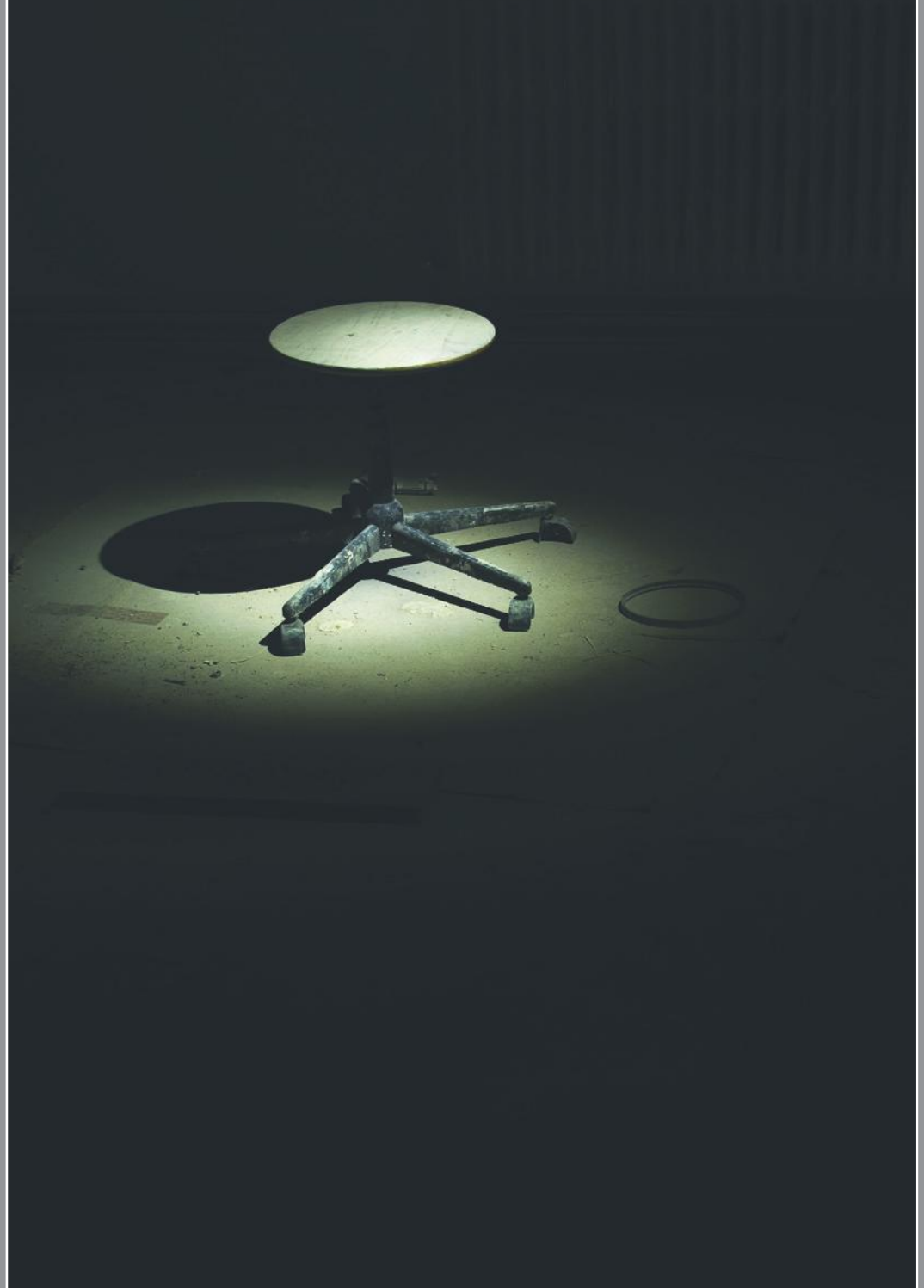
Nikon D300, 50 mm lens set to f/10, 1.6 seconds at ISO 250. Nikon SB-600 fired at full power.

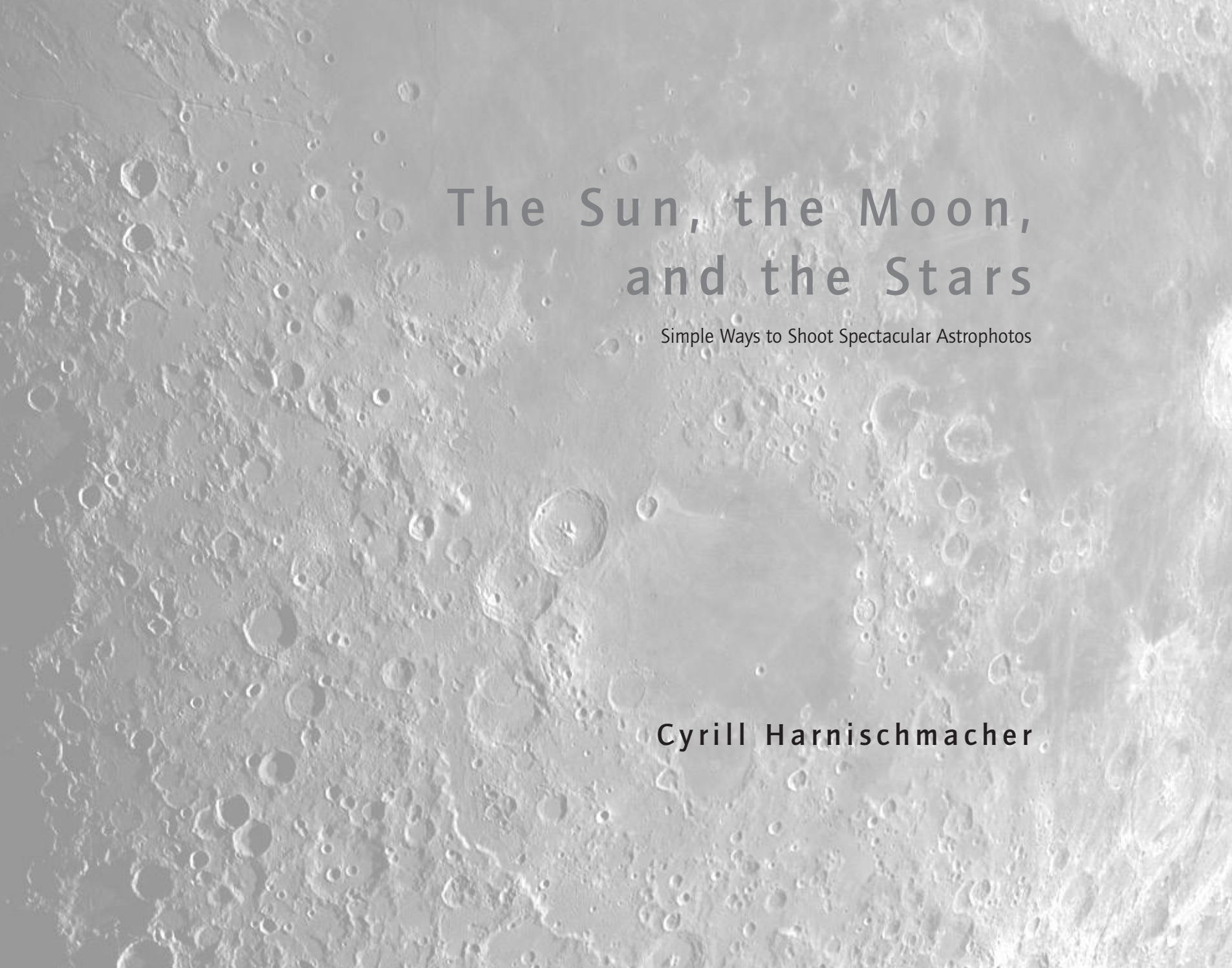
Nikon D300, 35 mm lens set to f/5.6, 8 seconds at ISO 640. Nikon SB-600 fired at 1/2 power.

There are unlimited ways to use night flash creatively. Try experimenting with different flash power settings, colored filters, or multiple flash units with different exposure times. As an alternative to flash, you can use car or construction site lamps, or even flashlights to light your scene. The important thing is to experiment: many aspects of a night shoot cannot be planned anyway. There are no hard and fast rules for the apertures or shutter speeds you can use and it is up to you to decide how you want to construct your shot. So much freedom might seem frightening, but it does provide enormous creative potential. The photos on the following pages were all taken at a construction site and show familiar

scenes in a completely new light. Everyday objects become stylized and fascinating through the careful application of unusual lighting.

The techniques I have described are intended to be copied, altered, combined, and developed. Get out there and experiment—with a little courage and some patience you will soon be having fun making your own night flash photos. And you never know, you might even end up having an interesting conversation or two as you try to explain why you are running through the forest at night with a flash gun!





The Sun, the Moon, and the Stars

Simple Ways to Shoot Spectacular Astrophotos

Cyrill Harnischmacher

This cloudy, moonlight scene was shot in two stages: one shot for the Moon, and one to ensure correct exposure for the clouds.

Astrophotography is one of the most exciting things you can do with a camera, but first attempts can often cause frustration and disappointment. Spectacular amateur astrophotos in specialty magazines raise the question of how to capture images of the night sky successfully, and the answer is usually: "With patience, experience, and expensive equipment." But don't be put off. You can achieve great results without purchasing an enormous telescope or spending hours practicing your technique.

Shooting the Moon

Our nearest neighbor in space exerts an irresistible attraction on photographers and non-photographers alike, and is the only heavenly body whose details can be seen with the naked eye. In order to capture frame-filling photos of the Moon you simply need serious focal length. You can shoot atmospheric shots of a cloud-covered full moon using a 400 or 500 mm lens, but you can get right up close if you use a mirror telephoto lens with a teleconverter. For example, a 600 mm mirror lens, together with a 2x teleconverter and a DSLR with a sensor crop factor of 1.5, gives you an equivalent 1800 mm focal length lens which you can use to fill virtually the whole frame with the Moon.

Avoiding Camera Shake

Because long lenses amplify camera shake, it is important to protect the camera from unwanted vibrations. The first step is to use a high-quality tripod with a stable ball-head or tilt mechanism that doesn't slide out of position when you attach a heavy lens. A geared tripod head is ideal as it allows you to fine-tune your camera's position to follow the Moon during the course of a night. It can help to set your camera up so that the Moon is positioned at the left edge of the viewfinder when you start your session. This way, you have time to prefocus and you will be ready to shoot when the Moon reaches the center of the frame.

Releasing the shutter also causes camera shake, and the movement of the camera's mirror can cause blurring as well. Use your camera's mirror lockup feature if it has one. A cable release (or, even better, an infrared remote release) is also essential for avoiding camera shake. You can, of course, use the camera's self-timer to release the shutter, but remember that the Moon will actually move a number of millimeters across the frame while the self-timer is running, so your subject may end up off-center.

The Top Hat Method

If your camera doesn't have built-in mirror lock, you can also use the so-called "Top Hat Method" to produce shake-free astrophotos. Set your camera to an exposure time of two or three seconds and hold a piece of matte black card in front of (but not touching) the lens. Release the shutter using a cable release, pull the card away from the lens and then replace it as quickly as you can. With a

Moon magnification for various focal length lenses (from left to right): 300 mm, 500 mm, 1000 mm, 1800 mm

little practice, you will be able to shoot shake-free photos with shutter speeds of about 1/4 or 1/8 second. If your image is too bright, you will have to be a bit quicker next time, or you can stop down your aperture to give yourself more time during the exposure.

Focusing

You will generally have to focus manually when taking astrophotos simply because most super-telephoto lenses don't have autofocus. Additionally, autofocus often fails when used with the very small apertures that most long lenses have. Unfortunately, simply setting focus to infinity doesn't always work either, so you will have to rely on the view through the viewfinder. You will quickly see that even the smallest camera movements can spoil your focus setting, so it useful to develop the habit of keeping your eye a short distance from the viewfinder. The only time you really need to touch the camera at all is while you are focusing the lens, so I recommend that you invest in an angle finder to avoid the risk of developing backache during a long session.

The Right Place at the Right Time

Your camera's position also influences the quality of your results and a little planning (as well as an eye on the weather report) can help you to eliminate the following disruptive factors and get better pictures.

- **General air turbulence:**
  If the stars "twinkle" visibly, there is air turbulence about. You can either wait for better weather or shoot anyway and hope that some of your images are usable.
- **Partial air turbulence:**
  Rising warm air, caused by open windows in winter or by sun-warmed streets in summer, can also interfere with your view. Changing your position can help.

The "Top Hat Method" helps you produce shake-free photos without the aid of mirror lockup.

- **Soft Floors:**
  If you set up your camera and tripod in your garden, its own weight can cause it to sink into the grass and spoil the focus setting. You can avoid this problem by placing mats or tiles under the tripod's legs
- **Unstable Surfaces:**
  Obviously, you should set your camera up on a stable surface, and you should avoid making unnecessary movements near your camera while you are shooting. Balconies and roof terraces are surprisingly susceptible to vibrations.
- **Stray light from street lamps:**
  This is more likely to be a problem for long exposures, but you should nevertheless position your camera away from brightly lit areas—unless, of course, you want to include the city lights in your photo.

Exposure

Due to the long focal lengths and teleconverters we will be using, the working aperture of our setup will be very small. A 2x teleconverter will turn a bright 300 mm f/4 lens into an 1200 mm f/16 super-telephoto, and a 500 mm f/8 mirror lens into a 2000 mm f/32 monster with appropriately long exposure times. At ISO 100, you will need to use the following approximate exposure times:

• Full moon	f/16	1/60 second
	f/32	1/15 second
• Half moon	f/16	1/15 second
	f/32	1/4 second
• Sickle moon	f/16	1/4 second
	f/32	1 second

You can compensate for longer exposure times using higher ISO values, but image quality will suffer as a result. It is better to use the lowest possible ISO value and to shoot, if possible, in RAW or TIFF format. RAW image files allow you to improve contrast and sharpness later, while JPG images are difficult to optimize once they have been saved.

Inside Your Photos

If you are interested in interpreting your results, the Internet is a great source of information on the Moon in general and other related topics. An interesting example can be found at http://en.wikipedia.org/wiki/List_of_craters_on_the_Moon, where I was overjoyed to discover that there is already a crater called Cyrillus :-)

It is also interesting to look for the Apollo landing sites, although it is virtually impossible to see actual details of the astronauts' tracks or equipment, using even the most powerful telescopes. It is nevertheless awe-inspiring to photograph the place where mankind was "so far from home".

Detail Photos

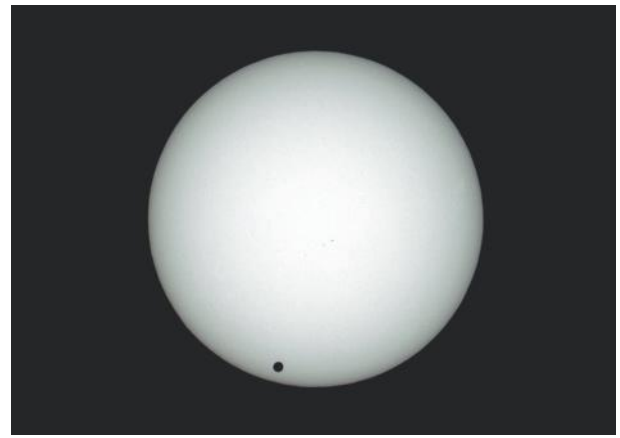
If you want to take detail photos of particular craters or other parts of the Moon's surface, you can do this by attaching a compact digital camera to the eyepiece of a telescope. Here, you will either need a dedicated telescope, or you can build your own using a telephoto lens, as described in the "Near and Far" chapter in this book.

The photos on the right are by Martin Wagner: one shows the total eclipse of the Moon on September 11, 2003, and the other an airplane passing a full moon.

Photographing the Sun

The Sun appears to us to be of a similar size to the Moon, so you can use similar focal lengths for taking photos. The major difference between the Sun and the Moon is that the Sun is about 500,000 times brighter than the Moon when observed from Earth, making it essential to protect your eyes during observations or while taking photos. Specially manufactured sun filters are available in glass or sheet plastic versions and block up to 99% of the sun's light. Glass sun filters built to fit large lenses or telescopes can cost several hundred dollars, so we will be using a much cheaper photographic sheet sun filter with a density of 3.5 (i.e., with just 0.03% transmission). This type of filter reproduces the sun in white, which is why photos taken using them are called "white light" shots. You can usually see some sunspots in white light photos, and we are currently entering a new phase of solar activity, so now is a good time to start practicing. White light filters are also great for photographing solar eclipses and planet transits, although these types of events are both quite rare. The next Transit of Venus will take place on June 6, 2012, and will be fully visible in the northwestern United States. The next Transit of Mercury will take place on May 9, 2016, and the next partial solar eclipse will take place on January 4, 2011. So, there is still time to get your solar photographic skills up to speed.

WARNING: It is ESSENTIAL to mount a special sun filter IN FRONT of your lens before observing or photographing the Sun. DO NOT view the Sun through an unprotected optical instrument, as SERIOUS INJURY or BLINDNESS can result. Make sure your sun filter is securely fixed during use and don't leave your equipment unattended. Warn companions of the dangers and turn your camera or telescope away from the Sun before removing the filter.

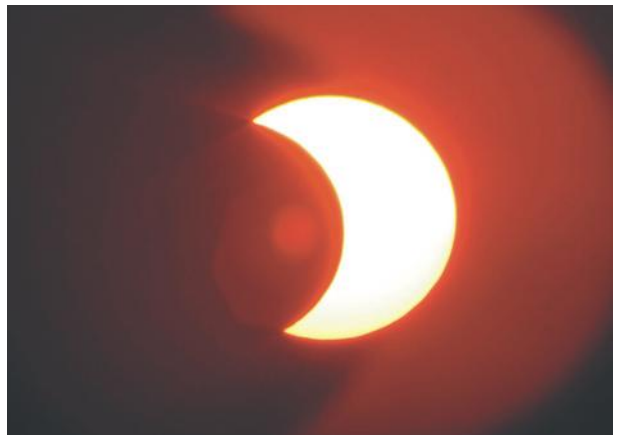


White light photograph of the transit of Venus across the face of the Sun on June 8, 2004, shot using a 600 mm mirror lens with a 2x teleconverter and a Baader AstroSolar sun filter. Several sunspots are visible toward the center of the Sun.

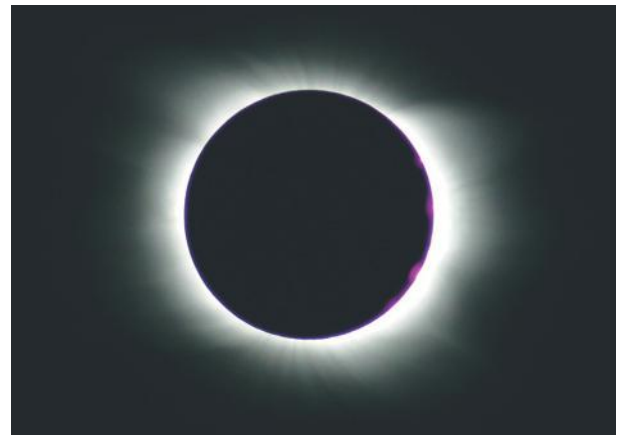
Solar Exposure Times

In contrast to lunar photography, you can use relatively short shutter speeds to photograph the Sun. The values listed here assume an ISO 100 setting and use of the 0.03% filter described above. These values are approximate and serve as a starting point for your own experiments:

• Clear sky	f/16	1/4000 second
	f/32	1/2000 second
• 50 % cloud cover	f/16	1/500 second
	f/32	1/250 second



Partial eclipse of the Sun on May 31, 2003, showing the rising Sun shrouded by the Earth's atmosphere. The colors in this photo were optimized manually.



The corona of the total solar eclipse on March 29, 2006, shot in Libya. Photo: Martin Wagner

• 100 % cloud cover	f/16	1/125 second
	f/32	1/30 second

As with the Moon, it is important to photograph the Sun using low ISO values and RAW shooting format in order to get the maximum detail out of your images.

Build Your Own Sun Filter

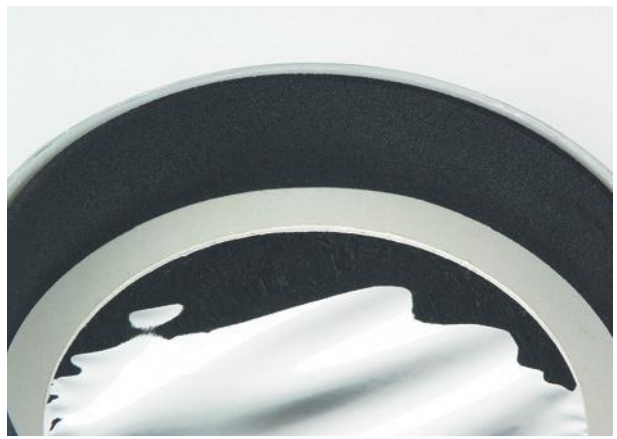
You can build your own sun filter using a piece of cardboard, a circular cutter, a sheet of sun filter material (available at http://www.telescope-service.com/baader/solar/solar.html), glue, and the lid of a tin can. The lid should be slightly wider than the diameter of the front element of your lens (or its built-in lens shade). Use a scroll saw to cut a hole in the tin lid, making a circular frame; then use a file to smooth the edges of the hole. Now cut two circles of card to fit snugly inside the tin lid and cut a hole in each to leave an approximately 1 cm hoop. Cover one of the hoops with glue and place it on the filter sheet and cut off the excess filter once the glue has dried. Now glue the second, stabilizing hoop to the back of the filter. You can now insert the filter into the tin lid frame. I recommend that you glue a ring of foam rubber to the inside of the filter to ensure a snug fit. Make sure that the filter sheet remains intact, and store your filter carefully in order to protect it from dust and damage.

Additional Sun Filters

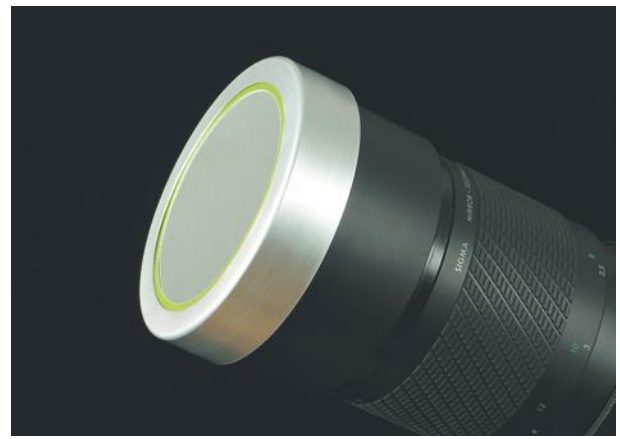
If you are shooting afocally (i.e., you are using a camera to shoot through the eyepiece of a telescope), you can also use an additional Solar Continuum or K-Line 395nm filter for your eyepiece. These filters allow you to take photos within a very limited visible spectrum and produce highly detailed images of sunspots and the Sun's surface patterns.

You will need some thick card, a tin lid, a circular cutter, glue, a Baader sun filter sheet, and a clean surface to build your own sun filter.

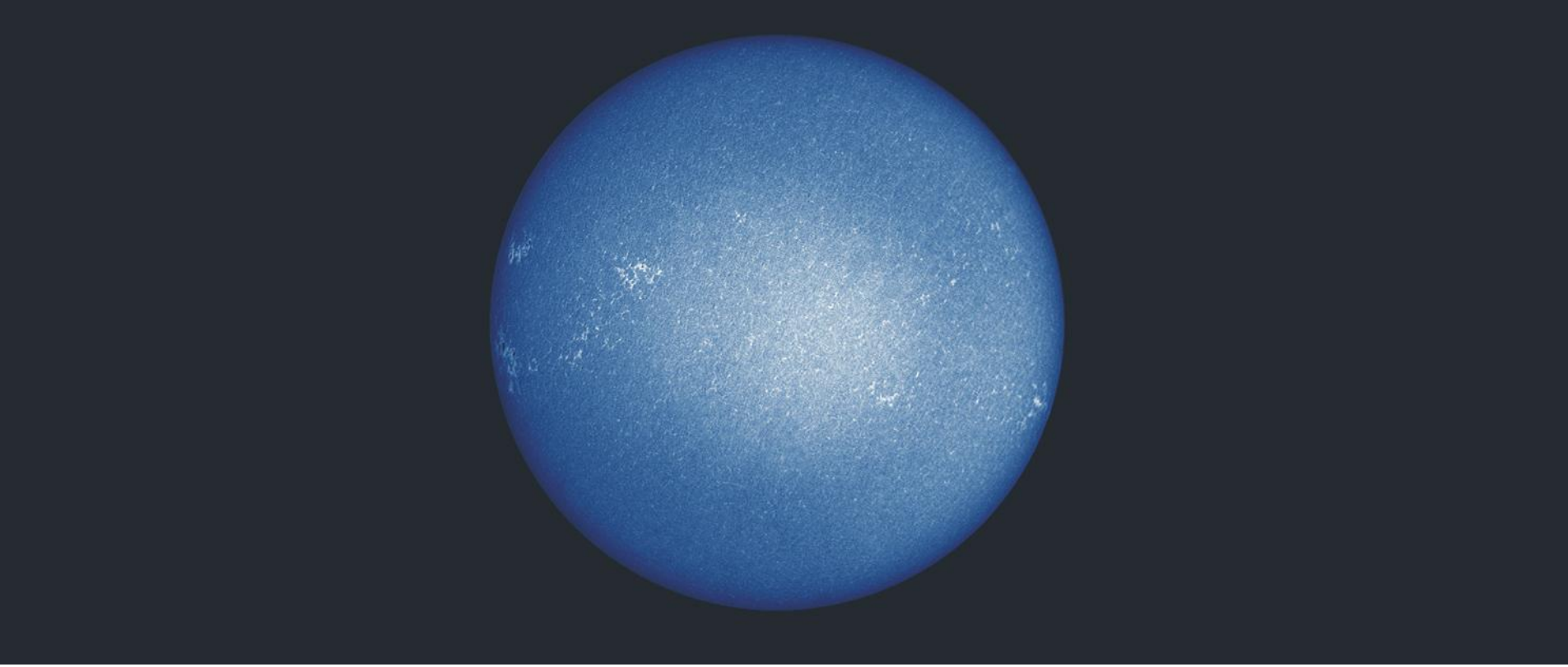
Once you have cut out your cardboard ring, you can glue it to the filter sheet and cut away the excess. A second cardboard ring is used to stabilize the filter insert.



A ring of foam rubber inside the finished filter helps protect it from scratches and ensures a close fit.



The finished sun filter should fit snugly enough so that it cannot be dislodged accidentally.



Specialized Solar Telescopes

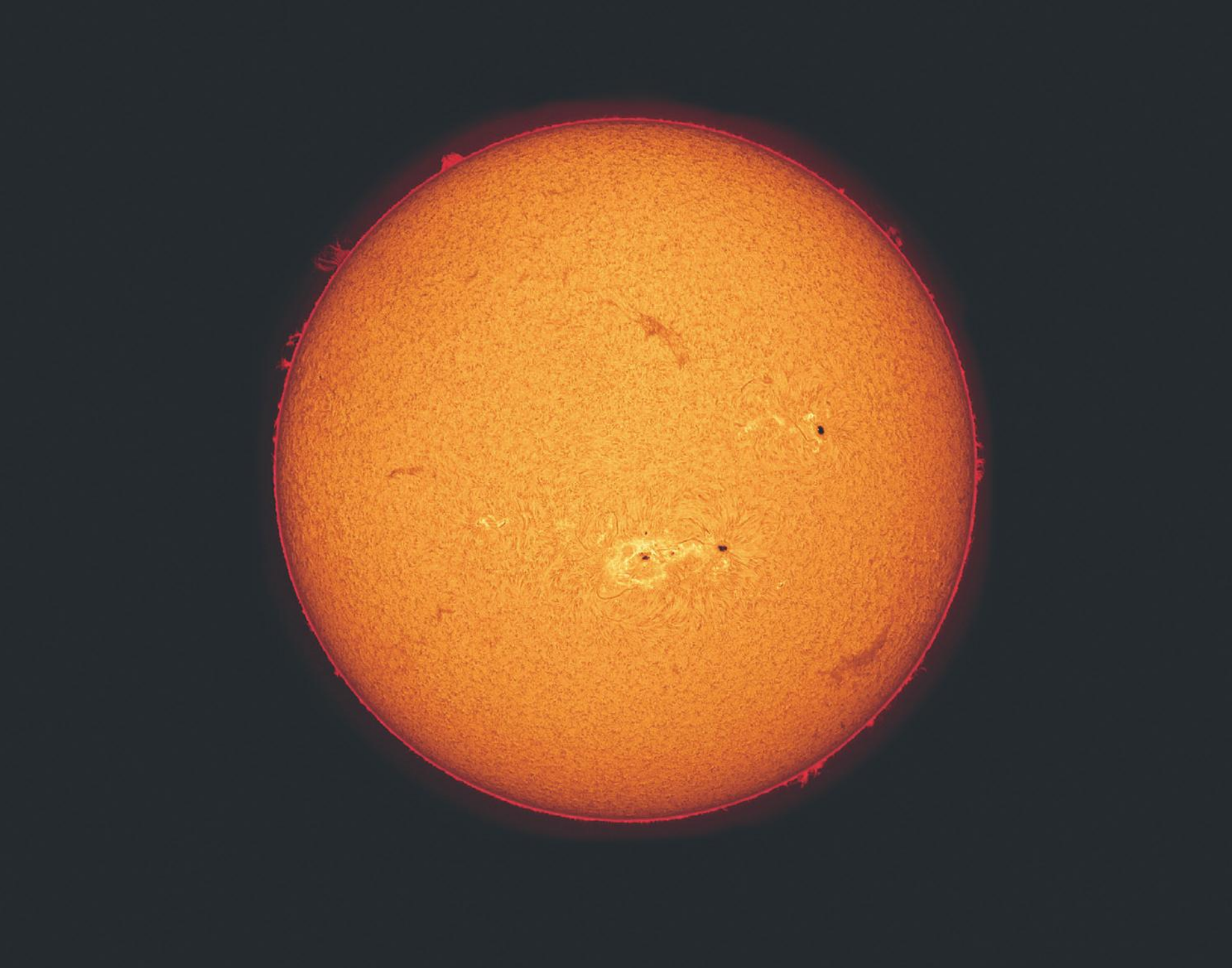
Using a specialized H-alpha telescope further increases the scope of your solar observations, and can help you to see that the Sun is not just a bright circle in the sky, but that it really is a glowing ball of burning gas at the center of the universe.

The Coronado PST (Personal Solar Telescope) is an interesting instrument for solar observation. It has a 656.28 nm wavelength and a 400 mm focal length. It is extremely compact and portable and is, importantly, much cheaper than most other high-quality solar telescopes. The PST can be used to observe details in the Sun's chromosphere as well as solar flares and, with an appropriate adapter, can also be used to take photos.

Calcium-K 395nm solar photograph
Photo: Stefan Seip, (www.astromeeting.de)

Overleaf left: H-alpha 656.28nm solar photograph
Photo: Stefan Seip, (www.astromeeting.de)

Overleaf right: White light solar photograph with the ISS visible.
Photo: Martin Wagner



The instinctive desire to photograph a starry summer sky while on vacation is strong. My own first attempts to do just that all ended up black. However, with a little practice, you will be able to take acceptable astrophotos using a normal camera—the only provisos are that your camera has a bright (i.e., large-aperture) lens and that it can be set up to make long exposures. Fixed focal length lenses are best, as the focal length of a zoom can change accidentally during long exposures.

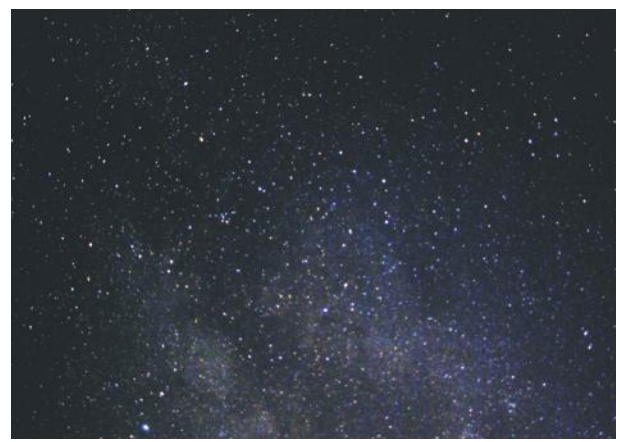
Shooting from a Fixed Viewpoint

In order to shoot photos of a clear, starry sky, you need to find a place where stray light from neighboring settlements doesn't interfere with your shot, which is not easy to do in this day and age. Rural areas away from town (in the mountains or at the ocean) are best, although you can also achieve satisfactory results at home if you simply switch off all the lights and position your camera in the shade of your own house. The new moon is an especially good time to photograph the stars and, as mentioned in the "Moon" section above, try to avoid shooting into air turbulence and always use a tripod.

A long exposure helps to capture as many stars as possible in a photo, but the focal length of the lens being used and the positions of the stars in the sky do limit the scope of a single shot.

Because the Earth rotates beneath the sky and because your camera is fixed (via your tripod) to the Earth, the stars move across the sky during the night. Or, more precisely, they rotate around the North Star, which is positioned about 50 degrees above the horizon at the end of the "bob" of the Little Dipper asterism in the constellation of Ursa Minor. If you use too long a shutter speed to photograph the stars, they will no longer appear as bright points, but as trails of light in your image. The rotation signified by these trails becomes more obvious the farther away from the North Star you

Starry sky in an urban setting: 20mm wide-angle lens set to f/2.8, 20 seconds at ISO 1600



Starry sky in a rural setting: 20mm wide-angle lens set to f/2.8, 15 seconds at ISO 1600

look (i.e., if you point your camera to the south, the stars will appear to move faster). If you shoot facing north, you can use longer shutter speeds to capture your images. Always remember to take a compass with you on nighttime astrophotographic excursions. The length of an exposure that reproduces the stars as points of light depends on the focal length of the lens you are using. Depending on the direction you are facing, this value lies between 20 and 40 seconds for a wide-angle lens, 15-30 seconds for a standard lens, and between 8 and 15 seconds for a medium telephoto.

Lenses

You need neither a huge zoom range nor super-fast autofocus to take great photos of the stars. Zoom lenses can change their focus settings unintentionally during long exposures, so fixed focal length lenses are better. Old, manual lenses are cheap and are well suited to astrophotographic use.

Shooting Techniques

Attach your camera to a stable tripod with a ball-head or tilt mechanism. If you don't have a tripod at hand, you can simply place the camera on its back on the ground. Set your camera to manual mode and open the aperture right up. Now all you have to do is set focus to infinity and select the appropriate shutter speed. Use high ISO values, and, if possible, shoot in RAW or TIFF format. Release the shutter using a cable or infrared release and avoid taking any action that can jog the camera during the exposure.

Photographing Star Trails

Star trail photos are particularly sensitive to stray light, so use the lowest possible ISO value in order to avoid overexposure. Remember to use fresh batteries and always keep a spare set with

Bright, wide-angle lenses are especially suited to taking nighttime photos of the stars.

you. Having to give up halfway through a complex shoot due to dead batteries can be really frustrating. Try building foregrounds such as trees, cliffs, or old buildings into your image—these types of silhouettes form an interesting counterpoint to the circular motion of the stars.

Even if they are no longer state of the art, old analog SLR cameras are ideal for taking star trail photos. Many of them do not need batteries at all. And shoot on slide film if you can: this way, you always get to see your results and avoid the risk of your photos being interpreted as underexposed trash by the automatic development machines at the lab.

Image Processing on a Computer

At first glance, digital images of the stars tend to appear dull and lacking in contrast. They also often look overexposed. This is why it is important to shoot in RAW format if possible. JPEG images cannot be corrected as effectively or as selectively as RAW

images, and generally produce less pleasing results. Noise reduction filters should be applied sparingly, as they can quickly eradicate individual stars from your image. You can also load differently developed copies of a single image as Photoshop layers and adjust the darkness of the sky or the brightness of the stars by manipulating the individual layers.

If I have managed to whet your appetite, I recommend that you visit your nearest public observatory, where you can find knowledgeable people and information about excursions and lectures that are often open to experts and amateurs alike.

A star trail photo shot using a 50 mm standard lens set to f/2.8 and with a shutter speed of 8 1/2 minutes at ISO 100. Here, you can clearly see that individual stars have different colors.

Klip-Klap

Getting Started with Stereoscopic Photography

Tobias Pohl

Stereoscopic photographic techniques are as old as photography itself. The principle of stereoscopic imaging was known before the invention of photography anyway, so it was a logical step to apply the "new" medium to stereoscopy. Stereoscopic photos are based on two separate exposures that are made at a predetermined distance from each other (X, the "stereo base"), and which use the same principle as paired human eyes to produce an impression of depth. Stereoscopy works because images contain multiple object levels that partially cover each other. The challenge when making stereoscopic images is to make the different levels within the finished image interesting to the viewer.

The multiple object levels inside and outside the room give this image a pleasing feeling of depth.

Viewing Techniques

Stereo images can be viewed using a number of different techniques. The most effective of these involves projecting the two images through polarizing filters and giving the viewer polarizing eyeglasses that filter the object information appropriately. This technique involves a fair amount of effort and requires the use of a slide or computer projector as well as a special projection screen. Setting the projector up properly is also a complex business.

Autostereograms consist of two images presented (either as a print, on a monitor, or as a projection) at a predetermined distance from each other, and which appear three-dimensional if viewed "cross-eyed". The two images are thus only actually superimposed in the viewer's brain. This is a simple, non-technical method, but requires some practice before the viewer can be sure of seeing the stereo effect.

The anaglyph stereoscopic technique superimposes two images on top of one another and uses color filters to make certain details visible to either the left or the right eye. This technique can be applied to prints or to images on a monitor. The same colored filters (red/blue, red/cyan, or red/green) are built into the special eyeglasses used for viewing anaglyph images. Viewing anaglyph images is simple, but the technique is less appropriate for color images because the colors of the filters themselves are no longer present in the viewed image. If, like me, you like to shoot black-and-white images, you can use these instead as the basis for anaglyph experiments.

Shooting Techniques

There are various ways to shoot paired images for stereoscopic use:

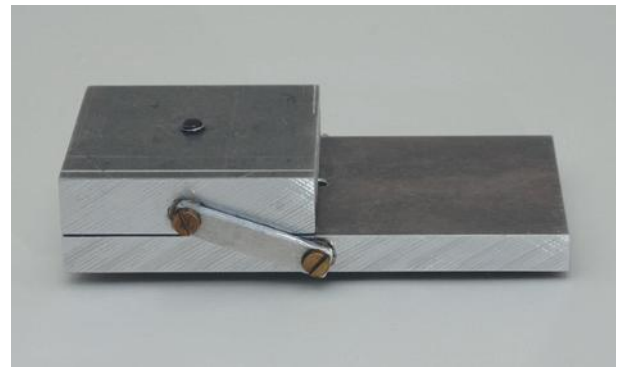
- Use a stereo camera with two identical lenses
- Use a normal camera with a special mirror attachment
- Use two identical cameras with identical lenses and settings
- Use a single camera, shifted between shots

For practical (and financial) reasons, I decided to take the last approach. This method is also flexible and can be applied to just about any type of camera. All I had to do was to decide how to actually go about making my double images. I worked up the solution step by step, starting with an aluminum plate with two holes drilled in it to represent the stereo base. This worked fine for architectural and landscape shots, although it required time and effort to dismount the camera and move the aluminum plate from left to right between shots. The time-lag also meant that the lighting or the position of objects in the image often changed between shots, making it difficult to shoot homogenous images and making shooting stereoscopic images of people impossible. My next attempt involved using a macro rail to shift the camera from side to side, but this was just as time-consuming and of no real, practical use.

It became obvious that I needed to "flip" the camera from side to side as quickly and simply as possible. The result was the "klip-klap" that you can see in the illustrations. The finished klip-klap was comprehensively tested by my fellow students and received a general thumbs-up. You can even use the device to make stereo photos of people, provided that they can keep still for the two or three seconds required to flip the camera. I chose the size and strength of the materials to accommodate compact cameras as well as larger, heavier SLR cameras and lenses.

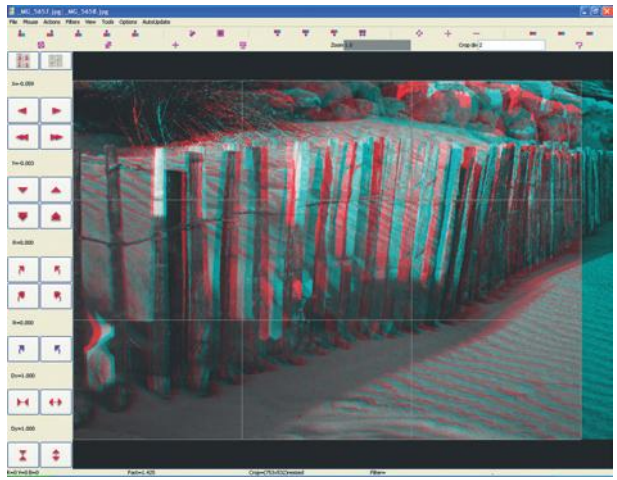
The Stereo Base

I chose the klip-klap's stereo base of 65 mm for two reasons: Firstly, the average distance between adult human eyes is approximately 65 mm; and secondly, 65 mm allowed me optimum scope for photographing objects stereoscopically between the 2.5-meter near point and the 15-meter far point. Objects that are nearer than the near point cannot be effectively photographed for stereo



The finished klip-klap

The klip-klap mounted and ready to shoot. Flipping the camera from one side to the other makes it simple to create two staggered images of your subject.



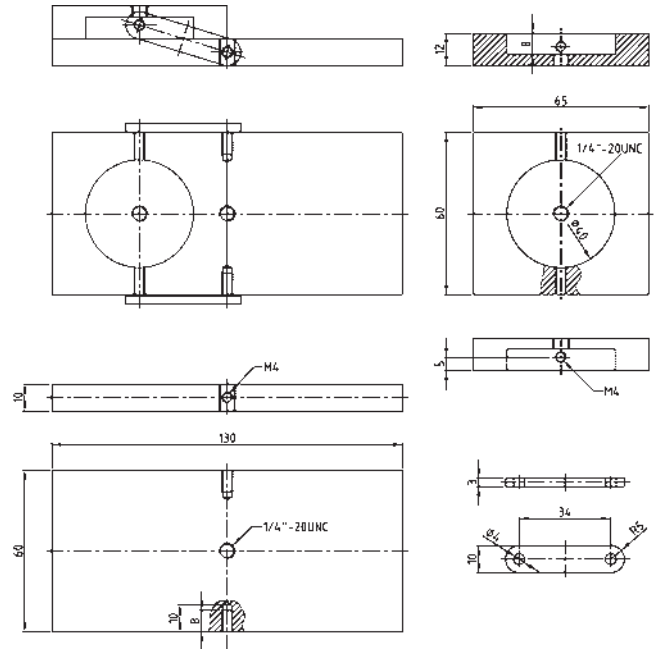
The free anaglyph program Anabuilder includes a wide range of tools and settings.

purposes and the human eye will alternate between viewing the left and right images. This effect is called image deterioration.

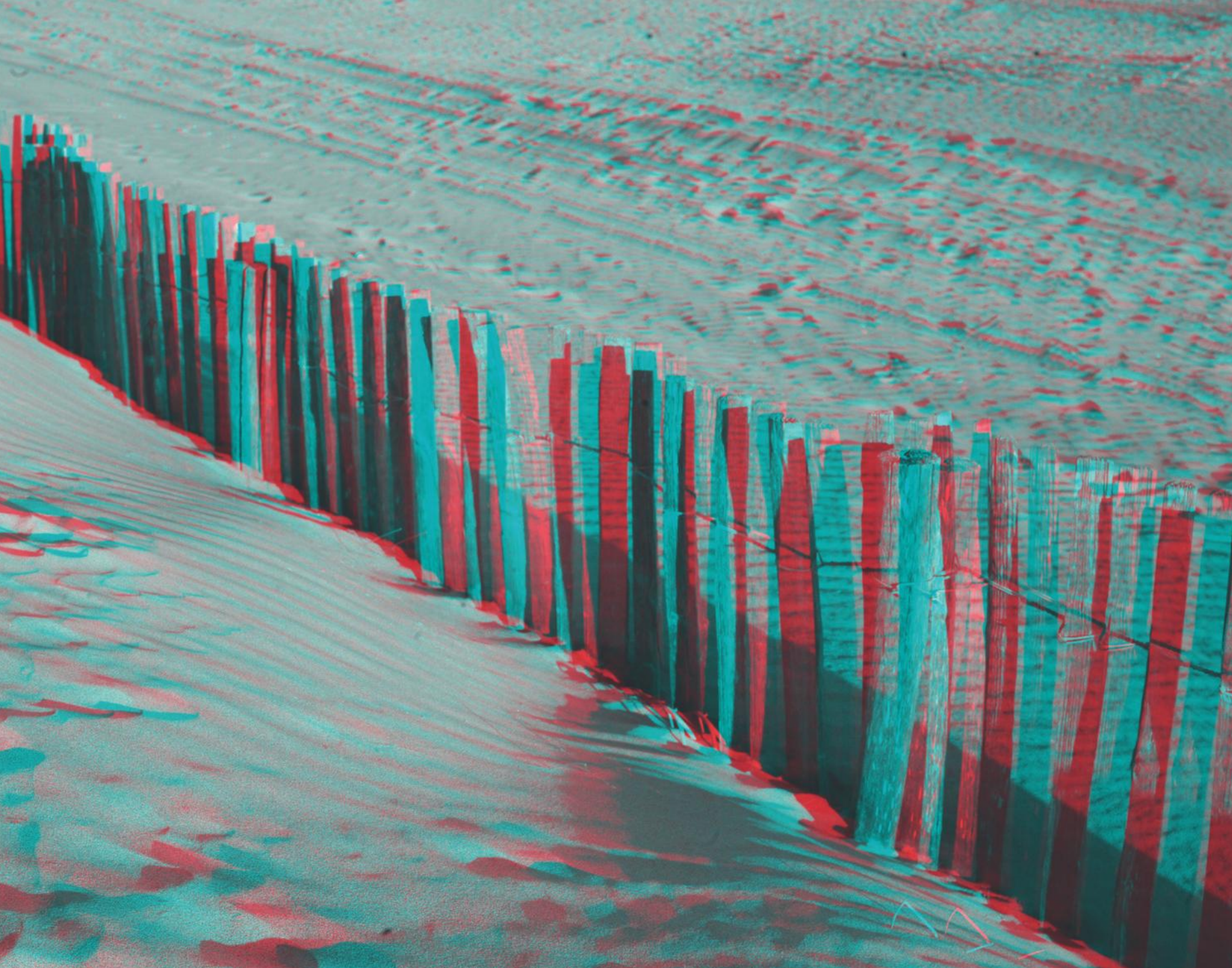
The human eye can no longer perceive depth at distances beyond approximately 60 meters, although you can work around this limitation by lengthening the stereo base. I prefer to photograph objects within the range my stereo base allows, and with the field of focus covering the entire range between the near and far points. Conventional photographic techniques that use selective focus to separate the foreground from the background produce unnatural looking stereoscopic images, and are best avoided in this context.

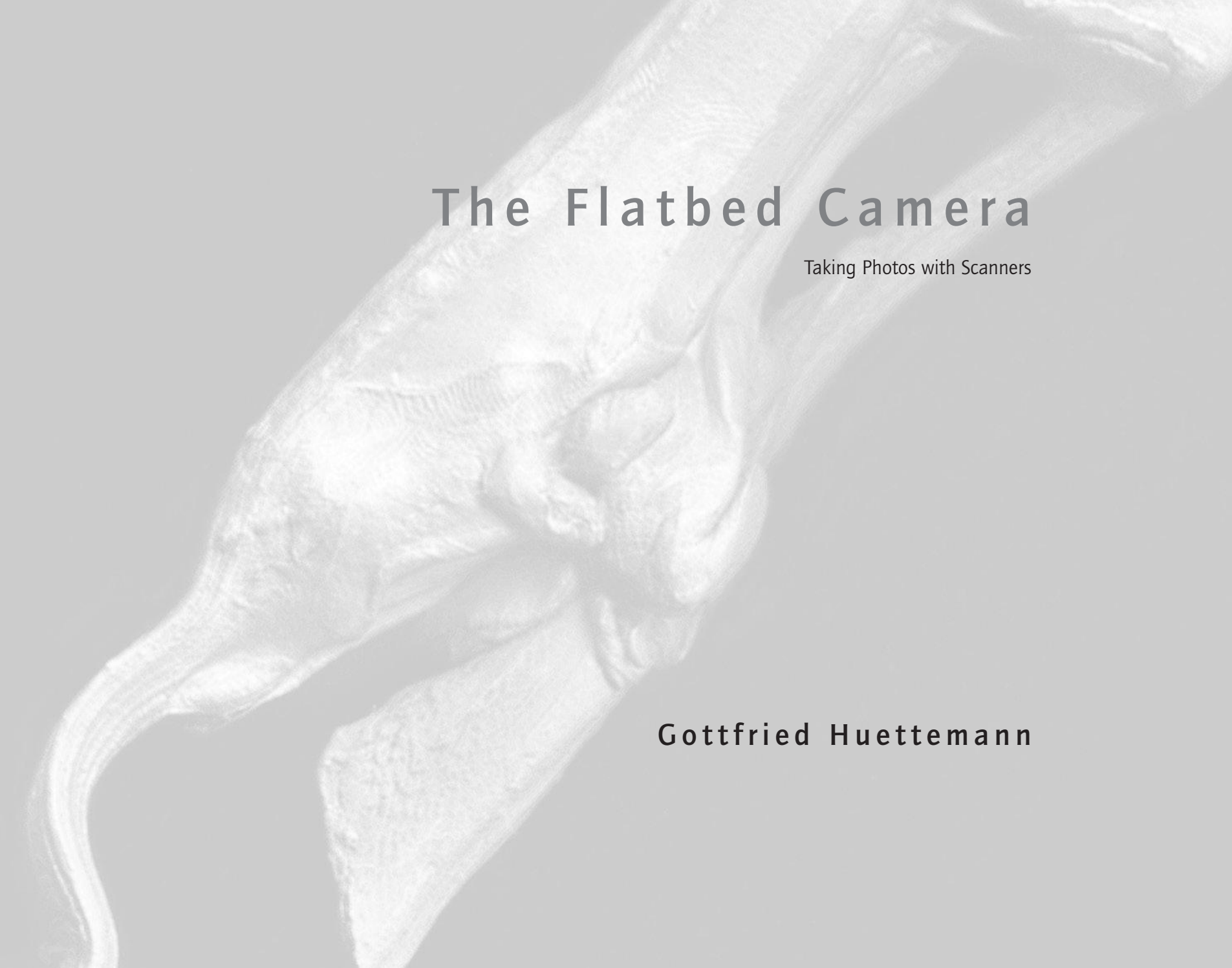
Links

You can download a free anaglyph program for Windows, Mac, and Linux at:
http://anabuilder.free.fr/anabuilderJava.zip



Design drawing of the klip-klap.
© Tobias Pohl, drawing by Juergen Kindermann





The Flatbed Camera

Taking Photos with Scanners

Gottfried Huettemann

Even cheap scanners can be used to make high-resolution images of three-dimensional objects and pictures. Some older, bulkier scanners are better than newer machines, as their lenses produce more depth of field than their modern, compact cousins. You can use 600, 1200, or 1600 ppi scans made using a high-end book scanner or a cheap mass-produced machine to make high quality digital or photographic prints measuring up to 40 x 60 cm, or even larger.

Once you have placed your (not too bulky) object on the document glass, you will need to experiment with the background. If you are working in a darkened room, you can scan with the cover open and without using a background. If there is a risk of stray light reaching the object table, you can use black card or a black velvet cloth to cover your object.

The images shown here are scans of small (eight to ten-inch) sculptures made from a type of elastic modeling clay that, unlike normal clay, reacts well to stretching and pressure. In order to get rid of the original, discouraging green color, I mixed the clay with graphite powder, which turned it glossy black. It is difficult to work precisely with this material, and my attempts to form preconceived shapes produced quite boring results. On the other hand, when I simply played with the material, unexpected but pleasing "finished" forms emerged which I tried to learn to recognize. The unpredictability and nightmarish absurdity of the results seem to reach into the subconscious, but still defy rational explanation.

In order to obtain as much data as possible, I scanned the sculptures in color and then converted the scans to black-and-white RGB files using the Photoshop Channel Mixer tool. A relatively steep gradation curve ensured that the gray parts of the background tended to black. I had some of the resulting images printed in large formats for exhibition purposes.

A piece of black velvet laid over the object produces an even black background in the final image.

What do You Print On?

Printing Images on Unconventional Materials

Michael Benecke

It all began in the summer of 2008, and Chris is to blame. "Chris" is the photographer Chris Marquardt, who many of you may already know from his Tips from the Top Floor podcasts. We met at a "Meet the Experts" workshop in Berlin in May 2008, where Chris and the image-maker Robin Preston were going through the steps involved in a digital workflow. This included everything from skillful composition right through to exhibition quality printing. While he was talking about profiling a large format HP printer, Chris extolled the virtues of the built-in photospectrometer with the claim: "Basically, you could write an ICC profile for a roll of kitchen towels and print on them in true color."

I found myself wondering who would want to do something like that and quickly came to the conclusion: I would! Unfortunately, I don't have a Z-Series Designjet of my own, but I do have a Photosmart Pro B9180 that happens to use the same printing system and a long, straight paper feed, so there was nothing holding me back.

Chris Marquardt, Robin Preston, and an HP Designjet Z3100 at the 2008 Meet the Experts workshop

The view along the paper path of my HP Photosmart Pro B9180. Here, you can see the wall behind the printer.

I bought some kitchen towels from the supermarket around the corner and placed them in the paper feed. I then defined a custom paper format and pressed Apple-P... but wait a minute! I quickly realized that about 75 percent of the kitchen towels available in my local supermarket were already printed anyway, and that the underlying plies had to be strongly laminated if I wanted to avoid them separating in the printer and causing a paper jam. Kitchen towels that are too thick and spongy are no good either, as they are simply not stiff enough for printing. I ended up using a three-ply generic product that I was able to load into the printer just like normal fine art paper.

I was wondering whether the inks would run, but HP's 100% pigment inks contain solid color material that cannot run in the normal way, so my colors ended up well saturated and with fairly sharp edges. Kitchen towels cannot, of course, produce the same brilliance as proper photo paper, but the quality of my prints was nevertheless surprisingly good. Incidentally, the B9180 can print

on paper with lengths of up to 1.2 meters, making it an interesting option for printing panoramas too.

Once I had conducted various kitchen towel experiments, I turned to textiles. HP offers a wide range of roll media for its large format printers, but these are unfortunately not available in sheet form for the B9180. Once again, it was up to me to find out what works and what doesn't. I ended up sticking a letter-sized sticker that has been lying around in my paper collection to the back of a cotton vest to stiffen the material so that it didn't clump and jam in the printer. The sticker was also easy to remove once the print was done.

Printing a panorama on five kitchen towels for mounting on a solid background

Preparing to print on a cotton vest. The cardboard insert prevents the material from distorting and snagging in the printer.

What else can we print on? Untreated synthetics turned out to be less well suited and, although the colors don't run, they don't stick to the fibers. Conclusion: cotton (basically a ready-made Photo Rag) is better, as the colors really do stick and also dry relatively quickly. You can use different cotton weaves to produce different looks in your prints and, if you protect the back of your material with a sticker (see above), you don't need to worry about the inks seeping through and making a mess of your printer.

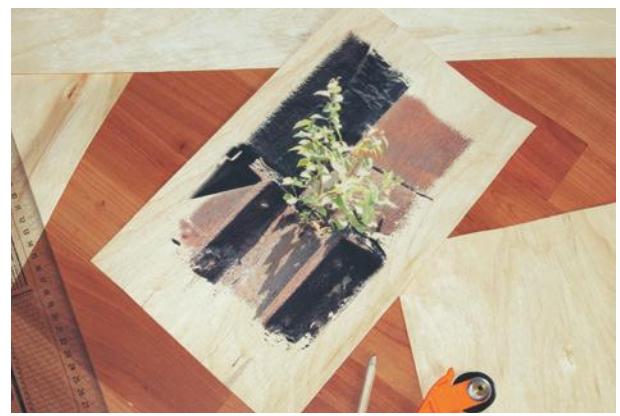
While I was preparing this piece, someone asked me if it was possible to print on edible paper, and immediately a new artistic challenge was born. A return visit to the supermarket was required, and this time I returned with a pack of rectangular rice paper wafers. Printing on the wafers turned out to be more difficult than I had imagined. If they come into contact with too much ink, they buckle so much that the print head rubs and makes ugly stripes all over the wafer's surface. The solution here is to use pastel strength colors. Unfortunately, HP inks are inedible, so we couldn't eat the results.

There is a carpenter's workshop near my home, and there are no prizes for guessing that I soon decided to look for printable material there, too. My search led me to a veneer supplier and I ended up with a selection of thin, well-dried, blond wood veneers. These all had to be less than 1.5 mm thick in order to fit through the printer and I had to make sure there was enough space behind the printer for the finished veneers to emerge. The printing itself was relatively easy for flat veneers, but things became more difficult if the surface was at all warped. The inks dried immediately, and the wood remained workable, making this technique interesting for carpentry or interior design projects.

Which brings me neatly to the potential applications of unconventional printing techniques. Many of you will probably be asking yourselves what I am actually hoping to achieve here, and I have to admit that simply satisfying my curiosity plays a significant role in my activities. My real motivation, however, lies in the perceived incompleteness of a creative process that is finished before the actual result is produced. I love to look at large-format, exhibition-grade prints, but I still feel that the creative process doesn't have to end there. The same way that earlier "chemical" photographers experimented with different ways of developing and printing their work, the digital imaging workflow offers a whole new range of ways to present visual material. This makes printing on kitchen towels seem like less of a crazy hobby and more of an artistic means to an end. For example, you can use kitchen towels as a temporary carrier medium for transferring an image onto a stone or a board. The necessary technique involves separating the top printed layer of the towel from the rest and gluing it to your chosen object using wallpaper paste. You can then remove the unprinted edges of the towel using a pumice stone or a scrubbing brush. You can flatten the image or deliberately allow it to crease to form new textures. By the way, the idea for this technique comes from my daughter's experiments with paper serviettes at playschool.

A printed vest becomes a picture and the coat hanger is its frame. Everyday objects become photographic exhibits with a whole new life of their own. A portrait of an attractive woman can literally be "good enough to eat".

Rice Paper wafers are a crunchy alternative print medium.



An herbal subject printed on organic material unites nature with nature.

The ideas I have described here are just the beginning, and I have a whole list of other things I will be printing on in the future, including aluminum plates and chamois leather.

The printing industry is also helping to expand my range by inventing products that make it possible to get printer inks to stick to all kinds of things for which they weren't originally designed. The Digital Ground products from Golden Artist Colors (which I found accidentally while googling) are an example, and I am really excited about where these materials will lead my creative drive. But one thing is certain: in the near future, I will be feeding my printer with even more obscure materials.

In order to make the entire process easier, you need to take care when you are feeding your chosen material into the printer. Kitchen towels need to be carefully torn off at the ready-made perforations, as simply ripping a piece of towel from the roll creates a rough edge that the printer can't handle. You should lay kitchen towels flat for a while before printing on them. Other materials should have clean corners too, and textiles need to be mounted on a stiff carrier (see above) before they can be inserted into the feeder. My printer refused to take some types of paper for reasons I haven't been able to discover, but I managed to trick it by feeding it normal paper first. Some types of paper, such as toilet paper or facial tissues, are simply too thin and get horribly tangled in the printer's rollers. I have had a couple of hairy experiences, but my B9180 is a robust machine that can cope with a fair amount of abuse.

You can print on a B9180 as soon as the ready lamp lights up. The printer's driver allows you to save custom formats, and you need to enter the proportions of your medium accurately, as the printer physically measures the width of the medium in the machine and won't print if the measurements are not correct

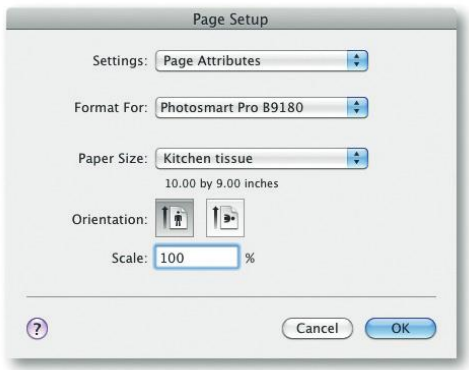
I used wallpaper paste to glue this image of a seagull to a stone.

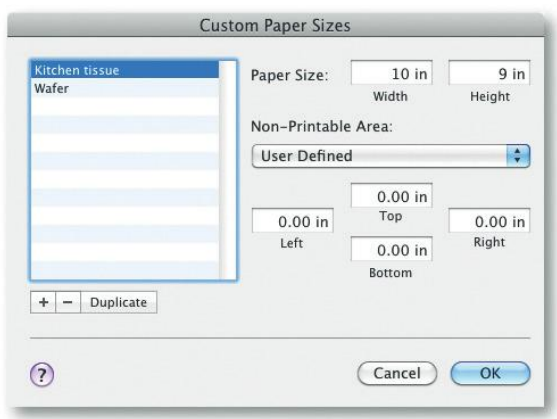
When printing, I select a suitable color profile and an appropriate output medium. If I am using an absorbent medium, I usually use the Water Color setting, and I select a Hahnemühle smooth fine art paper for printing the edible wafers. The artists' canvas profiles are great for printing on textiles and there is even a dedicated profile for stiff materials such as wood veneer.

The printer's usually high color accuracy is not guaranteed when printing on unusual materials, but accuracy is less important than creativity for this type of work anyway. You can use a densitometer to calibrate the B9180, but it doesn't have a built-in spectrophotometer like its large format cousins, making it impossible to profile accurately. You can of course write your own ICC profile for your preferred brand of kitchen towel, which is where all this started.

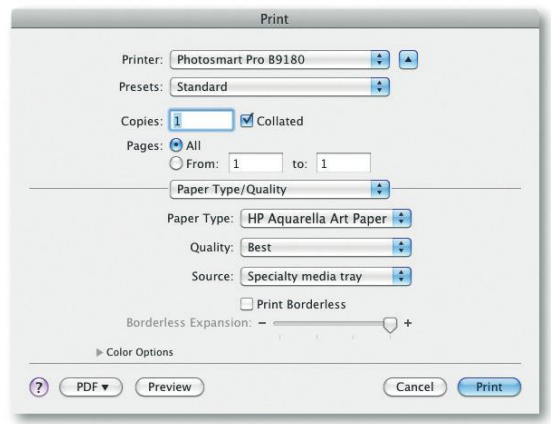
Other Suitable Printers

All of the examples described here were printed using my HP Photosmart Pro B9180, but I assume that similar printers made by other manufacturers will do a similar job. The most important features that a printer needs in order to print on unusual materials are a straight paper feeder and the ability to print using pigment inks.





The printer driver's Paper Type dialog



Selecting an appropriate output device color profile in the Photoshop Print dialog and the paper type in the Printer Properties dialog.


hp


abc
def
jkl
mno
tuv
wxyz

Gotcha!

High-Speed Photography Using a Photoelectric Shutter Release

Cyrill Harnischmacher

Some things are invisible to the human eye because they are too small, too far away, or too dimly lit. Other things, such as the beat of an insect's wing or a falling raindrop hitting the ground, cannot be seen because they happen too quickly. In order to make events like these visible, we need technical help. We can capture some high-speed events simply by using a short shutter speed, but some things happen so fast that the neither the camera nor the photographer can react quickly enough and you end up with either a blurred photo, or no photo at all. This is where remote-controlled high-speed photography steps in.

Equipment

As with other photographic specialties, you can achieve a certain degree of success by simply using expensive accessories. This article aims to show you how to capture spectacular photos more simply. Apart from your camera, you will need one or more flash units and a photoelectric cell. We used the battery-powered infrared "Jokie" cell and reflector manufactured by Eltima Electronic. This model is small, light and relatively cheap, and is compatible with most popular SLR cameras. Accessory flash units for mounting on the camera's hot shoe are better than studio flash units for this type of photography, as studio units have flash times between 1/500 and 1/1500 second, which is too long for our purposes. Accessory flash is not as powerful but much faster. Here, as an example, are the flash times for a Nikon SB-26 Speedlight:

- Full power: 1/1000 second
- 1/2 power: 1/1100 second
- 1/4 power: 1/2500 second
- 1/8 power: 1/5000 second
- 1/16 power: 1/8700 second
- 1/32 power: 1/12000 second
- 1/64 power: 1/23000 second

The individual parts of the photoelectric release (from left to right): connector cable, reflector, photoelectric cell, release cable, battery pack.

Marking the launch position with a ruler and a strip of wood

There are no limits to what you can drop or what you can drop into.

You can also use softboxes or other accessories to tune the light from your flash units. If your flash has a standby mode, make sure it is "awake" before you start shooting.

The Basic Setup

The electronic release we used consists of a transmitter with a built-in receiver and a reflector. These two components have to be set up so that the transmitter beam is reflected back to the receiver. The check light switches off when contact has been made and the camera can then be connected to the transmitter using the special cable provided. Now, when an object passes through the light beam, the camera's shutter and the attached flash unit(s) will fire.

The Jokie has a reaction time of approximately 0.013 second, and most modern DSLRs have a shutter delay of between 0.01 and 0.04 second, so you will need to allow for the combined lag when planning your shot. This means that once an object has passed through the light beam, it will move a certain additional distance before the camera's shutter releases. In order to calculate this distance, you would need to know the exact speed of your object, so it is actually simpler to set up the light beam a short distance from your subject and make test shots to determine exactly how far away it needs to be. Placing a ruler next to your setup can help you to judge the required distance more precisely, and you can mark your exact shooting position on a strip of wood placed at right angles to the ruler.

Choosing Your Subject and Planning Your Shot

You can use this type of release mechanism to photograph falling objects, timid animals, or flying insects. Photographing animals in

Once you have used test shots to find the optimum launch position you can start to shoot the "real thing".

Small shifts in the point of impact are unavoidable.

the wild always requires some luck as well as patience, but whatever you decide to photograph, you will need to plan your shoot carefully. The more precisely you can predict your subject's movements, the better your chances will be of capturing a unique photo. Your chances of success are, of course, better in a controlled home or studio environment where you can reproduce the same conditions for every test shot. In order to make your efforts worthwhile, remember to light your background properly, also. If you are working with liquids, a sheet of glass placed in front of the lens (but outside of the field of focus) is a practical way to prevent your gear from getting splashed. If that is too complicated, a clear glass filter attached to the lens is a good alternative. It is difficult to remove water or milk drops from a lens without damaging it, and you will be surprised how far drops of liquid can fly!

You can use an eyedropper attached to a tripod to release drops of water and you can use a soup plate or a plastic bowl as a target. There are no limits to what you can photograph: a sugar cube falling into coffee, or an olive falling into a cocktail glass, or even strawberries hitting yogurt all make great subjects. Basically, you can drop anything into any liquid—the results are guaranteed to be interesting.

If you want to photograph larger objects falling into water, you can use an aquarium as your target, and a piece of a windshield wiper will help you to get rid of the air bubbles that form on the sides every time you drop a new object.

Make sure your object is not heavy enough to break the aquarium. Additionally, you can protect the bottom by attaching a piece of foam rubber to the glass before you fill your "pool" with water.

The setup consists of several pieces of wood, the photoelectric transmitter and receiver, a background picture, and a homemade crossbow. A cushion behind the subject catches the bolt. Remember to wear goggles and to cover your furniture with some kind of protective plastic sheeting when you are shooting photos like this.

The Famous Egg

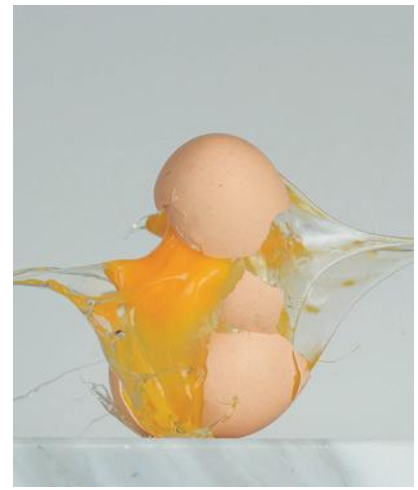
The photo of a breaking egg on the cover of this book was slightly more complicated to shoot (and to clean up afterwards!). The basic element of the setup was a sheet of wood with the photoelectric transmitter and an improvised crossbow attached. I built the crossbow from a piece of aluminum rail, a length of spring steel and some string. This arrangement was powerful enough to break the egg, but couldn't produce enough kinetic energy to demolish apples, strawberries, or tomatoes. I used a white card and a picture of a blue sky as background, but a picture of a sunset or a landscape can be just as effective for this type of shot. The egg was placed in line with the aluminum rail and I positioned the light beam to catch the bolt as soon as it left the crossbow. Pebbles, a sharpened pencil, or a screw make suitable "ammunition". A cushion behind the stage prevented the bolt from damaging anything. I wore protective goggles, and I attached a clear filter to the lens and covered the camera body with a plastic sheet for protection.

Once my setup was complete, I used a balloon filled with sand to make some test shots. I marked the positions of my sand "egg" and the crossbow string with a pencil in order to be able to reproduce them later for the grand finale. Once I had found the right distance and direction and was happy with the lighting, it was time to shoot for real.

I glued the egg down with a couple spots of hot-melt adhesive to prevent it from falling over or being hurled out of the frame by the impact of the bolt. It was fascinating to see just how different

Test shot with a sand-filled balloon

Gluing your egg down prevents it from shooting out of the frame on impact.



Strike!

the results were, depending on the consistency of the egg and the type of projectile I used. Other variations include shifting the launch position so that the camera captures the projectile before, during, or after its flight through the egg. A picture of a complete breakfast would make an interesting alternative to a plain background.

Once the fun was over, the only slight downer was cleaning up the mess, even though a plastic sheet covering the whole "arena" saved a lot of extra work.

If you are interested in reading more about high-speed photography, I would like to recommend two books:

Stopping Time by Harold Edgerton
Caught in Motion by Stephen Dalton
You can find additional information about the photoelectric receiver I used at www.eltima-electronic.de.

Soft-Focus Lens

Create a Lensbaby Effect with Vaseline

Mike Hagen

One of the newest trends in photography is the use of selective focus to add creativity to your photographs. Being able to pick which areas of your image are sharp and which areas are blurry is a great tool for visually drawing attention to the most important part of your photograph. Presently, entire companies have been built up around the concept of selective focus. Specifically, Lensbaby has a full line of SLR lenses that allow you to pick and choose what parts of the scene are in focus and what parts of the scene are blurry. This is a powerful creative effect and is really gaining in prominence around the world. There are Lensbaby Flickr groups, selective focus photo workshops, and thousands of tutorials on the internet on how to achieve the selective focus look using Photoshop. Lensbabies can cost anywhere between $150 and $300 depending on which model you buy and which accessories you add. However, you can achieve a very similar effect with a simple UV filter and some petroleum jelly, such as Vaseline. As with most things in photography, what used to be old is new again. This method of using Vaseline smeared on a UV filter is a classic photographic tool and has been around for decades as a way to induce creative blur. The goal of this tutorial is to demonstrate how to achieve the selective focus look on a bargain basement budget.

Vaseline can be purchased very inexpensively at most drug stores.

Preparing for the Shoot

In order to create this bargain selective technique, you'll need to buy a small amount of Vaseline petroleum jelly and a low cost UV or Skylight filter for your lens. The Vaseline petroleum jelly can be purchased from just about any drug store or grocery store for about $3.00. Since you don't need very much Vaseline to make the effect work, a small 2.5 oz. tube will last for a few years of photography. If you don't have Vaseline, then you can use just about any type of thick, oily product to create the same effect. For example, Vick's Vapor Rub, mineral oil, or clear lubricating grease will all work just fine. The goal is to be able to leave a thin layer of oil over the filter. Since the whole purpose of these photographs is soft focus, you don't need to purchase a high quality filter. Just buy the least expensive UV filter you can find. You should be able to buy a 67mm or 72mm UV or Skylight filter for approximately $10 to $15 from most camera stores. If you are an internet shopper, you can frequently find used UV/Skylight filters on www.ebay.com and www.amazon.com for just a few dollars.

Applying the Vaseline

The true art to creating beautiful selective focus photos all comes down to how you apply the Vaseline to the filter. The most important tip is to use a very small amount. Start out by just touching your finger into the Vaseline and then start smearing it around on the glass. If you need more Vaseline, then touch the end of your finger with a little bit more. You'll be amazed at how little Vaseline you need for a nice effect.

The goal with your Vaseline application is to keep your subject so that it is identifiable, but blurry. Therefore, a light sheen is generally more desirable than a heavy layer. If you put too much Vaseline on the filter, then just clean off the filter (described below) and start over again.

Some people like to use a Q-tip to apply the Vaseline, but I prefer to use the tip of my index finger. The reason why is that Q-tips will often leave bits of cotton fiber on the Vaseline that show up as dark spots in your photograph. If you want, you can use a tightly woven rag to spread around the Vaseline, but you don't have as much control as you do with your finger tip. Also, you don't want to use a plush rag for the same reason as you don't want to use a Q-tip as it will frequently leave particles on the Vaseline.

I have to make an obvious statement here–don't put the Vaseline on the front element of your lens. Only put Vaseline on the UV filter. The last thing you want is to have to send your lens in for professional cleaning because you have grease and oil all over the front element. When you are applying the Vaseline to the UV filter, I suggest doing it while it is mounted on the front of the camera lens. In this way, you'll be able to see the effect in real time as you look through the viewfinder. I usually set up my camera on a tripod to compose the photograph for a visually pleasing image. Next, I focus the camera on my subject and then switch my camera to manual focus. I do this because it is nearly impossible for the camera to auto focus through the Vaseline filter. Then, once I'm happy with the composition, I screw on the filter and begin applying the Vaseline.

There are thousands of ways to apply the Vaseline pattern and all of them create their own unique look. For example, a very light, even sheen will give everything in the photo a glowing look while directional lines will create diffusion around objects like trees and roof lines. Following are a few suggestions for applying the Vaseline.

Use horizontal smears on the filter to create long vertical diffusion in the photo as shown in the next image.

The vertical diffusion in this forest scene is caused by creating horizontal smears in the Vaseline on the UV filter.

Horizontal Smears

Use your finger to create horizontal smears in the Vaseline. This will cause vertical lines to appear in your image. This is counter-intuitive, but horizontal smears will cause items like trees to appear longer and more stretched out. It will also elongate the diffused

areas on the tops and bottoms of objects. For example, if you photograph a building with horizontal smears, the top of the building against the sky will diffuse upwards, thereby elongating the look of the building. A neat technique to try is to use vertical smears with trees, but keep bottom half of the filter untouched without Vaseline.

A neat effect can be created by keeping one half of the filter without Vaseline.

Vertical Smears

Use your finger to create vertical smears in the Vaseline. In the same way horizontal smears create vertical diffusion; vertical smears will create horizontal diffusion and will widen the look of your photos. For example, cars will appear wider because of the diffused out of focus areas that show up on the front and back of the vehicle.

Diagonal Smears

They will give the effect of rays of sunlight filtered through dusty air. This technique is often good to use in a forest where there is some bright sky behind the trees.

Circular Smears

Use your finger to create circular smears by starting in the middle of the filter and working your way towards the edges of the filter by drawing larger concentric circles. This type of smearing will result in lines radiating outwards from the middle of the image. This is a great technique to use for flowers so that the petals look like they are elongating in a beautiful blur.

Circular smears were created on the UV filter to create an image like the peony flower.

Radial Smears

Start in the middle of the filter and move your finger outwards in a straight line towards the edge of the filter. Although the smears on the filter will look like radial spokes, the effect will be a circular diffusion in the photograph.

Partial Smears

Leave a section of the filter untouched. i.e., without Vaseline, so parts of the image look sharp and other parts look blurry. If you leave the untouched section off center, then you can rotate the filter so you can place the sharp zone in different areas. I like to

For the blossom leaves to appear blurry toward the edges, I applied Vaseline in a circular smear.

leave the untouched area at approximately the 1/3 point so I can compose my image using the rule of thirds.

Clear Center

Put some Vaseline around the outside and leave the center clear. This produces a nice effect that varies slightly with aperture.

Make X Patterns

Start by making all the lines in your Vaseline in one direction, then

Here, I smeared the Vaseline in two directions, 90 degrees apart. This creates an X pattern which causes star patters to appear in your photo as shown on the next page.

come back and make four or five straight smears 90 degrees to the original smears.

Experiment

The tips shown above are just the beginning. Try different shapes with your smears to see what happens. Sometimes s-curves, zig zags, and spots can lead to amazing photographic discoveries. Don't be afraid to try something radical.

Shooting Techniques

Photography is all about light and this is even truer when using Vaseline on your filter. The quality of the ambient light plays a big role in the final image. I look for beautiful sunset light, soft overcast days, as well as harsh midday light. Each type of light gives a completely different feel to your photograph.

Be on the lookout for very graphic shapes that have strong backlighting. For example, long shadows on the ground against

These star patterns were created by making X pattern smears in the Vaseline.

green grass looks very nice when used with backlighting. High contrast scenes tend to work very well. Specifically, scenes where there are clear delineations between the bright and dark areas. It is in these areas where the Vaseline filter will really show great flare. The bold color of the bright area in the photograph will spill over into the dark areas and show a beautiful effect. For example, photographing the edges of a flower petal against a shadowy background will almost always create a beautiful effect.

Another type of photo that works very well is one that includes lots of bright and vibrant colors. When photographed with the soft blur of Vaseline, these photos tend to look very impressionistic, almost like a watercolor painting. Typically, scenes with flowers work best for this look.

Here are some suggestions for different photographic scenarios:

- Shoot backlit scenes
- Try black and white photography
- Night photography with city lights in the background
- Vibrant colors such as tulips and roses
- Evening sunsets
- Foggy nature scenes

Cleaning Off the Filter

Since you are going to be using a low-end UV filter for this project, you don't have to worry too much about how you clean off the filter. The easiest method I've come up with is to use a soft, absorbent cloth dipped in denatured alcohol or rubbing alcohol, This wipes the filter clean in just a few seconds and also evaporates

To create this interesting effect, I drew wavy lines in the Vaseline towards the edges.

Here, I used bold colors (blues and greens) with a heavy layer of Vaseline to create an impressionistic rendition of the forest.

very quickly so I can apply my next coating without having to wait too long. I don't recommend using tissues or rag cloths since they leave dust and bits everywhere. If you don't want to use alcohol, then a mixture of soap and warm water will work very nicely. Whatever method you use for cleaning off the filter, make sure you remove the filter from the lens before wiping it down. This helps protect your lens and camera from any mishaps during the cleaning process, such as dropping it into the bowl of water or spilling alcohol over the camera.

I like to clean the filter after each and every shoot and reapply the Vaseline rather than smear it around each time. Also, the grease will eventually harden, so it is easier to just clean it off after each shoot. If you elect to keep the Vaseline on the filter between shots, then you should protect your other gear from the grease by keeping the filter stored with another filter or lens cap screwed over it.

The easiest and fastest way to clean off the filter is to use rubbing alcohol or denatured alcohol. A small amount poured on a soft rag will quickly remove the Vaseline.

Little Planets

Seriously Twisted Panoramas

Christian Bloch

Panorama photography consists of 80 percent passion and 20 percent technical twiddling, although the twiddling is definitely part of the fun. Like any interesting hobby, the journey is its own reward, and I often find myself hoping that I will never actually "arrive".

At first glance, a little planet looks like a miniature model of a planet or some kind of fancy, designer Christmas tree bauble, but it is, in fact, panorama photos constructed using a special projection type that has hundreds of potential variants. The seamless merging of the individual images makes little planet panoramas particularly fascinating. The viewer's eye can wander around the image at will, recognizing individual details while being confronted with an overall impression that is anything but commonplace.

On the following pages, I will be describing some techniques and software packages that you can use to create your own "little planet" panoramas. I will be concentrating on technique and image optimization, but I will also include some subject ideas to help you get started on your own.

Spherical Panoramas

Spherical panoramas—with 360-degree horizontal and 180-degree vertical angles of view—are the best raw material to use when you are creating little planets. A complete review of the technique involved in shooting a spherical panorama would go beyond the scope of this book, but here is a quick overview of the basics:

Recommended Equipment

- A DSLR camera and a high-quality tripod
- A fisheye lens (10.5 mm Nikkor, 8 mm Sigma, or similar)
- A dedicated panorama tripod head (Nodal Ninja, 360 precision, or similar)

Shooting Technique

In order to photograph your complete surroundings, you will need to take source photos in four to eight different directions, depending on the focal length of your lens. The images should have 20 to 25 percent overlap so that they can be merged together without losing important details. A panorama head will help you to minimize detail shifts between the foreground and the background and has lockable settings for preserving your selected shooting angles. You can shoot your panorama without using a specialized panorama head, but using proper equipment makes the whole process much easier. The source images are "stitched" together using special software. PTGui, AutoPano Pro, and Hugin are great freeware stitching programs and function largely automatically, using the image content to determine where to place the seams. That may sound too easy to be true, but making basic panoramas really is quite simple once you have the hang of the principles. Talent is less important than practice and effective methodology. Beginners can learn quickly using the step-by-step guides in the following Rocky Nook books:

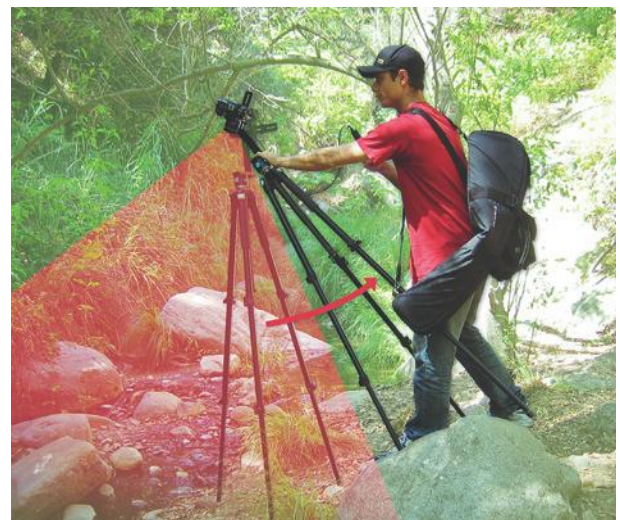
- *The HDRI Handbook* (by me!) - www.hdri-handbook.com
- *Mastering Digital Panoramic Photography* by Harald Woeste - http://rockynook.com/books/27.html

You need to take an extra shot in order to capture the nadir without including your tripod in the picture.

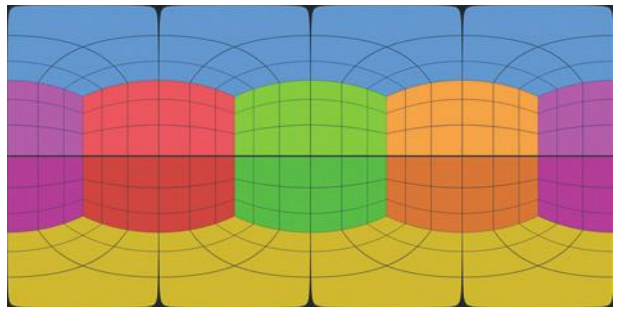
It is important to keep the center of the frame free of potentially distracting objects.

Capturing the Nadir

There is, however, one aspect of shooting spherical panoramas that I would like to address in detail. The nadir in a panorama is directly opposite the zenith, the point directly above the photographer. In order to photograph the zenith, all you have to do is point the camera directly upwards. It is more difficult to capture the nadir because it is covered by the tripod. This is not a problem for most panorama photos, as these are usually oriented to the horizon. However, in a little planet image, the nadir is positioned at dead center, making it necessary to take an extra shot of the ground beneath the tripod. It is usually too much trouble to remove the camera from the tripod, so tilting the tripod upwards with the camera attached is a simpler alternative. It doesn't matter if the tripod's legs appear at the edge of the shot, as we are only interested in the center.



In order to capture the nadir correctly, you have to rotate the complete camera/tripod assembly.



Schematic of an equirectangular panorama. Each of the major compass points is indicated by a separate colored square.

A finished equirectangular panorama image

You can then either mask the tripod's legs before stitching, or you can mask the unwanted parts of the image in Photoshop, save the images in TIFF format (preserving transparency), and leave the blending to your stitching program. If you did everything correctly, you will end up with a spherical panorama with what is known as an equirectangular projection. The image may look strange at first, but the illustration at top left (with each compass point shown in a different color) should help to explain the geometry.

Skillfully Twisted

There are two programs that I would like to recommend for turning your panoramas into little planets. The first is the freeware program Hugin (which also happens to be the best open source stitcher currently available), and the second is the commercial *Flexify* plug-in for *Photoshop*. Both programs are of equally high quality, are suitable for use with HDR images, and are available for Mac and Windows. Let's take a look at *Flexify* first.

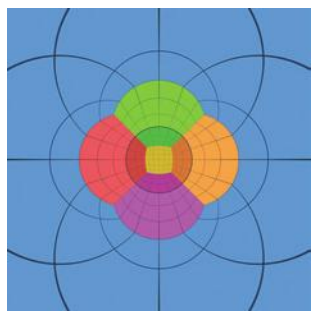
All of the settings are pulled together in one window and the large preview image makes working with the plug-in simple and intuitive. The most important settings for our purposes are:

- Input: equirectangular
- Output: hyperbolic, stereographic, or squoculus
- Latitude: -90°
- FOV: 110° to 140°

The input parameter tells *Flexify* about the geometry of the original panorama and the output parameter tells it which projection type to use for its output. The three options listed here are the most relevant of the more than 150 available in the plug-in, and they all simulate a kind of virtual fisheye effect. The laws of optics limit the field of view (FOV) of a fisheye lens to 90 degrees (measured from the center to the edge of an image), whereas the *Flexify* virtual lenses are capable of much more interesting effects. All three projections magnify and massively distort the sky (the blue parts of the preview image), but this effect is hardly noticeable if your source images were shot on a clear day. If there are clouds in your source images, the program will turn them into a dramatic-looking whirlpool that swirls around your finished little planet. You can use this magnification effect deliberately by setting Latitude to -60 degrees instead of -90, causing our virtual "super-fisheye"

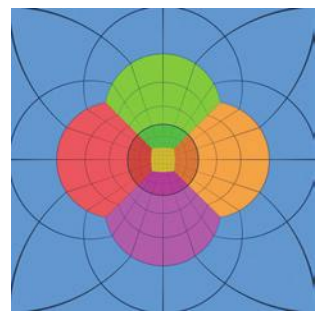
to shift the center of the image away from the actual nadir. Because we already know that the magnification effect is strongest at the edges, we can determine exactly which elements of the image we want to "inflate".

Flexify is a commercial Photoshop plug-in.



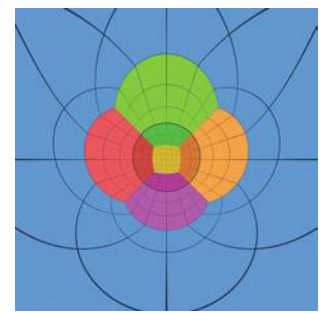
Stereographic, fov 130

Vertical distances in the side walls are distributed evenly. All details below the horizon are displayed as a relatively large planet in the center.



Hyperbolic, fov 130

The side walls appear to stretch toward the center and vertical structures are overly tall. The floor appears to be disproportionately small.



Squoculus, fov 120

Uneven distortion with emphasis on the foreground. Generally smaller in spite of an almost identical FOV.

A blue sky produces an almost homogenous background.

Cloudy skies produce chaotic effects.

Now things start to get really creative. You can use different Latitude and Longitude settings to produce an endless variety of dramatic-looking perspectives from a single source panorama. The results are not always predictable, and not all original images are suitable for "Flexifying". The most interesting results occur with panoramas that contain a lot of square and rectangular structures (such as buildings or rows of windows), or varied elements that point in different directions.

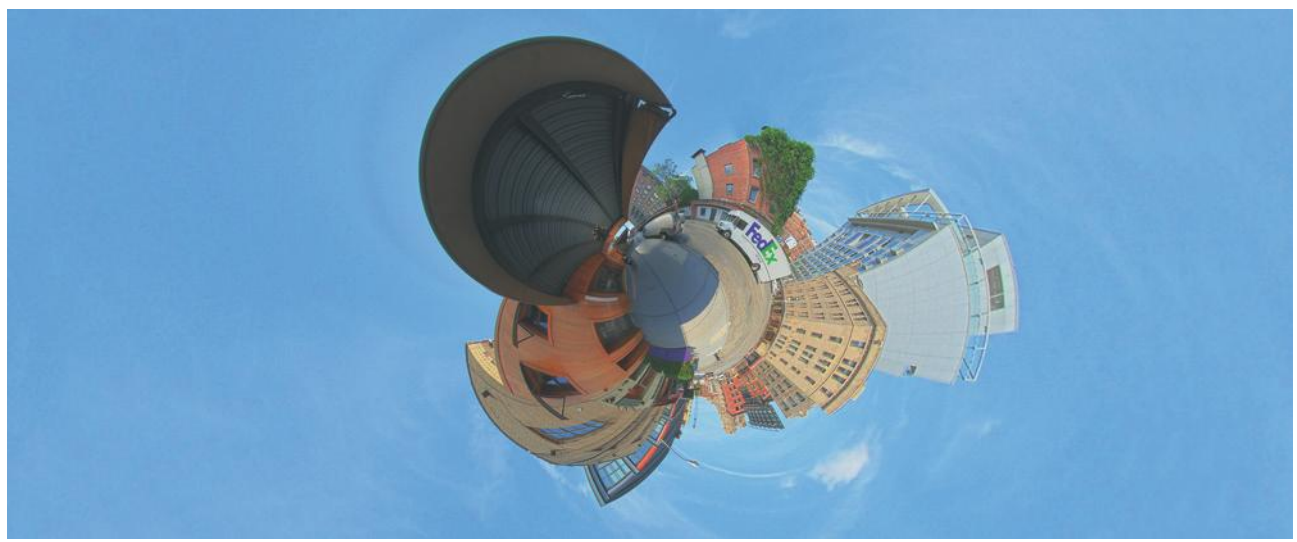
Adjusting the Latitude and Longitude settings can produce really strange results.

Above left: Monument Valley Road Closed. Here, I emphasized the wooden sign that was, in reality, quite small.

Above right: NY Bryant Park planet. The -80°Latitude setting gives the skyscraper a dynamic-looking curve

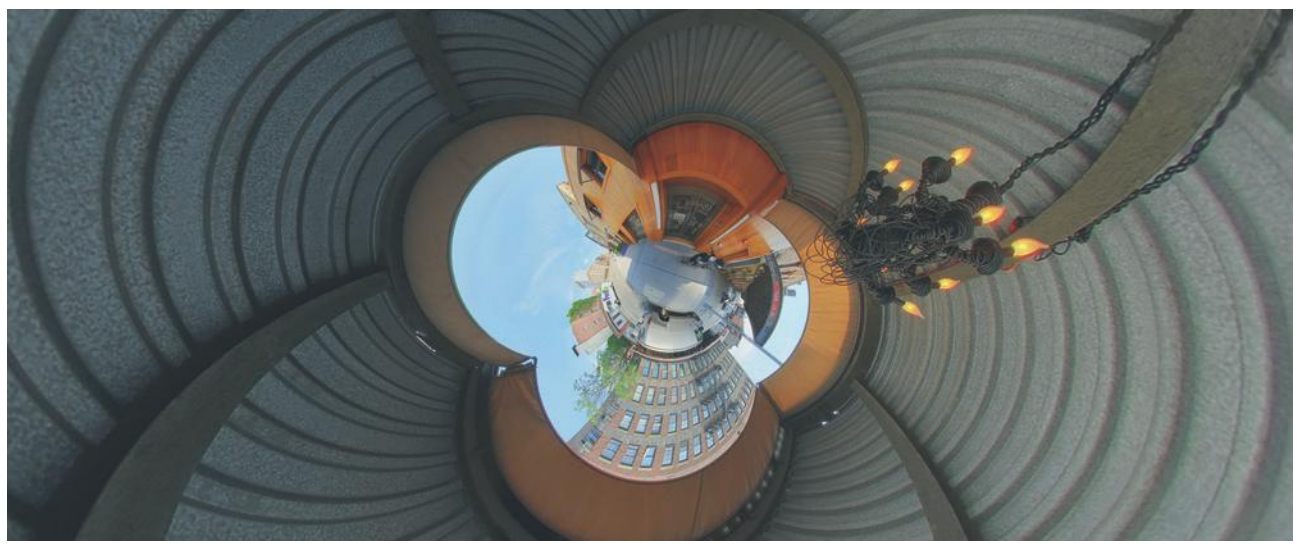
Below left: NY Bryant Park tunnel. Here, the +80° Latitude setting gives the same image a dramatically different look.

The original equirectangular panorama



The planet version has been tilted slightly downwards in order to position the sky at the edges of the image.

Tunnel 1: with my back to the door.



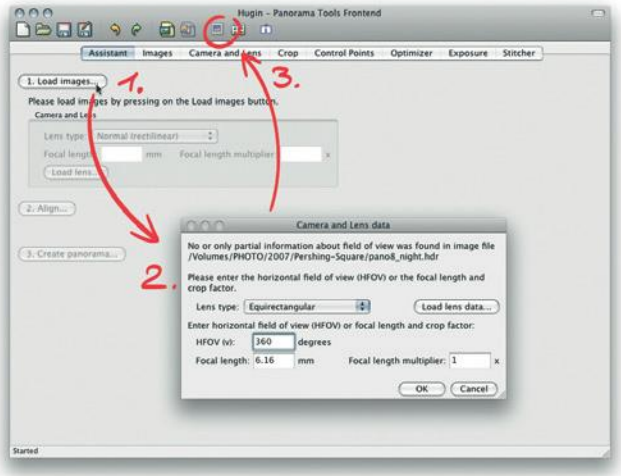
Tunnel 2: oriented directly down. This would result in a planet image if applied to other, more conventional subjects.

A Few Words about HDR Panoramas

HDR (High Dynamic Range) techniques come into play when a subject has a wider dynamic range than can be captured by your camera's sensor in a single shot. This is usually the case for 360-degree panoramas, as the source images stem from every point in a scene, and include everything from direct sunlight to the darkness under the sofa. This fact makes panorama and HDR techniques perfect partners. You can find 60 pages of comprehensive instructions on how to shoot an HDR panorama in my *HDR I Handbook* (see above), but suffice it to say that an HDR image has to be rendered down to 8-bit (using a technique called tone mapping) before it can be printed or displayed on a monitor. Tone mapping is a complex, manual process that is used to get the best out of the huge amount of detail that an HDR image file contains.

But what does this have to do with little planets? The crux of the matter is that it is simpler to turn an HDR panorama into a little planet first and then tonemap it afterwards. This is because tone mapping algorithms function on a highly localized level and only alter details within a limited, predetermined radius. Extreme changes in the image geometry, like those illustrated on page 162, completely change the basis of this radius and, as a result, details that covered only a small area in the original image can end up covering half of a finished planet. If we "planetize" after tone mapping has been applied, the uneven distribution of detail in the planet image can accentuate tone mapping errors in the original HDR source panorama.

Guenni's Skatelab Kickflip: Pro skater Stephan Guenther helps Etnies develop new shoes by performing an 8-step kickflip while dressed in a motion capture suit.



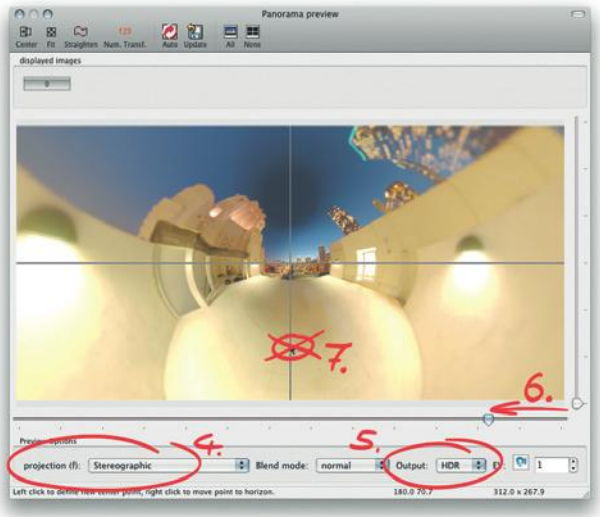
An Alternative Tool for the Thrifty

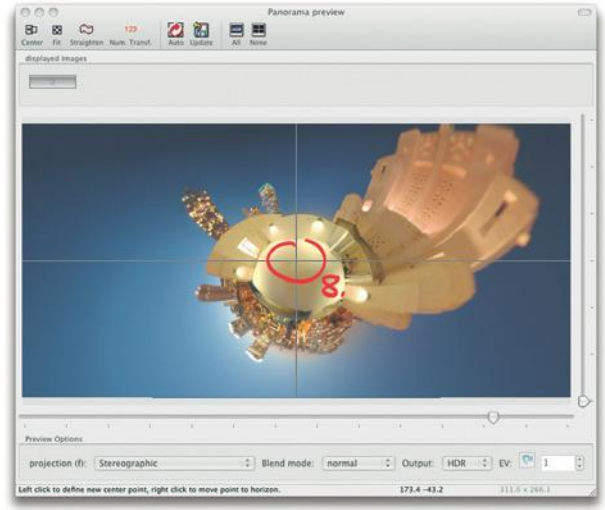
You don't own Photoshop? You can't afford Flexify? No problem! Hugin may not be quite as slick as Flexify, but doesn't cost a penny. And while I'm on the subject, here is a quick description of an HDR workflow:

1. Load your image (in OpenEXR or Radiance HDR format).
2. Make the appropriate camera and lens settings
   As this is a synthetic image, you need to make the following settings manually:

- Lens type: Equirectangular
- HFOV (v): 360 degrees

The "Best Trick Contest" on the Zumiez Couch skate tour, showing a whole bunch of photographers at a Californian skateboard contest.





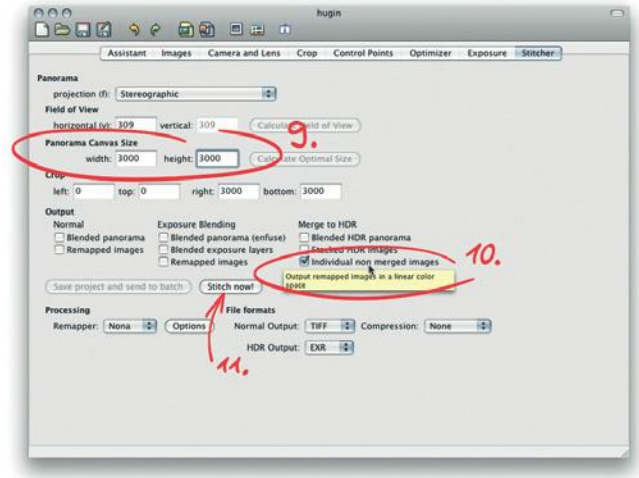
3. Open the Panorama Preview window by clicking the third icon from the right. Now make the following settings in the separate preview window which then opens:
   - Projection: Stereographic
   - Output: HDR
   - Initially, the HFOV slider (6) is positioned all the way to the right. In order to recognize any image detail, move the slider a little to the left to zoom in.
4. Now click on the nadir to center the projection around it, and bingo! You have created a little planet.
5. Now the fun really starts! Use multiple clicks with the same centering tool used in Step 7 to produce an interesting projection. Hugin's handling is not very intuitive in this respect, so be patient. I have to reacquaint myself with the program every time I start it, but with patience and a little luck, I usually end up with a pleasing little planet after about ten minutes of work. Now use the rendering tool (in the Stitch tab) to create your finished image.
6. Set the image size in pixels. It can be helpful to double your chosen value for HDR images, as you can always scale these down again later. The pixel values you select here also determine the aspect ratio of the final image.
7. Output: Individual non merged images.
   As this is a single image, no Blending settings are required, and this is the crucial option for producing satisfactory results from HDR source material.
8. Clicking "Stitch Now!" renders the finished image (see overleaf). If you want to tone map your image, Picturenaut freeware is a good place to start.

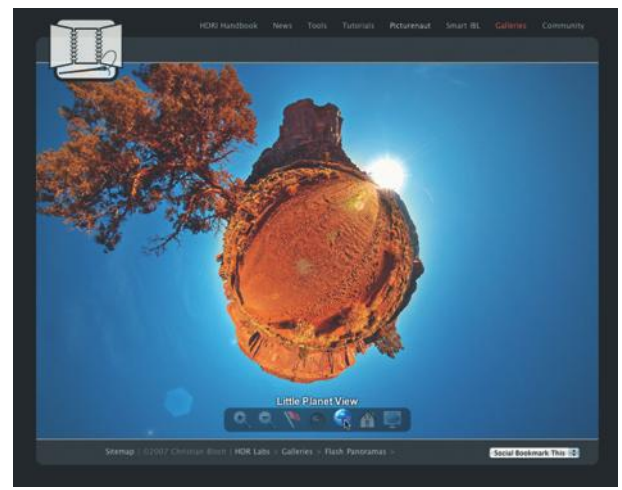
Interactive Planets

The Internet is the presentation medium of choice for many panorama photographers, and even allows you to present your little planets interactively. Flash animation makes it possible for the viewer to rotate his viewpoint and zoom in and out at will. The transition from planet to tunnel viewpoint and back is, quite simply, breathtaking. And finally, if you want to embed planet images in your own website, I recommend you use the *krpano* player.

Useful links:

krpano:	www.krpano.com
Hugin:	www.hugin.sourceforge.net
Flexify:	www.flamingpear.com/flexify.html
Picturenaut:	www.hdrlabs.com/picturenaut





Please visit the interactive planet show at:
www.hdrlabs.com/gallery/flashpanos.html.


Paul Hastings
HOLLOW


Light Changes Everything

Using Dedicated Flash Professionally

Martin Krolop

For a photographer, there is nothing more creative than presenting a location "in a new light". Creating a new mood is not really possible using just available light and a little artificial help, and a scene only really takes on new life once you introduce large amounts of additional light. That is what this piece is all about.

Introduction

Many professional photographers don't take on-camera flash units seriously until they get to see the results they can produce on a monitor or in a print. Accessory flash can do much more than just sit on the camera, but it sometimes makes life more difficult in the process.

Camera-mounted flash units are

- Compact and portable
- Fitted with built-in light shaping accessories
- Manually adjustable
- Fairly powerful

But they are also

- Battery-powered
- Narrowly focused
- Sometimes difficult to operate
- Not as powerful as we would like
- Not always designed for off-camera use

I am not a great fan of hot-shoe flash, but that is not the point. We are talking here about active use of accessory flash in professional photographic situations. So, without further discussion, I would like to state my case:

Accessory flash units are fantastic machines that get more powerful every year and allow photographers to enhance their

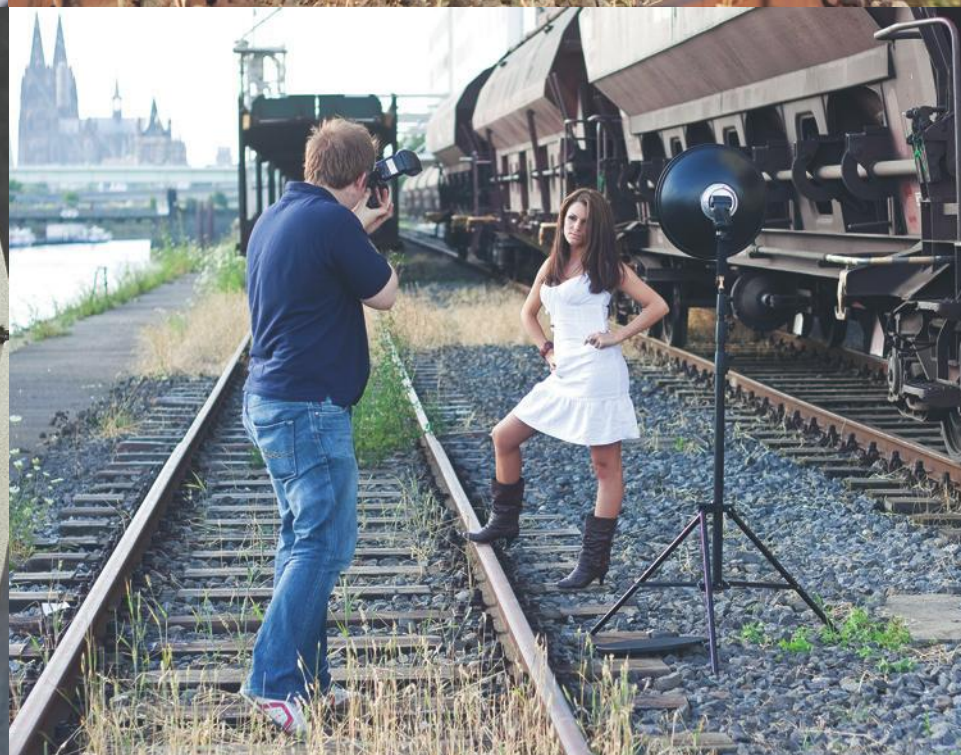
You don't need much equipment to control your lighting on location: just a flash controller on the camera and a flash in a softbox.

lighting anywhere without having to find a power outlet first. A photographer needs to be able to change lighting conditions at will. Mother Nature often makes this simple wish impossible, making artificial light indispensible in most situations. If you want to use a particular lighting effect, you simply have to produce it yourself. We use the flash2softbox system (www.flash2softbox. com) because it allows us to use studio-grade accessories on location.

We also use umbrellas, reflectors, or simple white walls to shape our light, and sometimes we use no accessories at all. The

The difference between the photos with and without flash is obvious. Both photos were shot using just one 40 x 40 cm softbox and a Canon 580 EX set to full power.

flash2softbox system offers a unique range of lighting accessories, including baffles, colored filters, barndoors, softboxes, and beauty dishes. The system is not designed to emulate a 1000-watt generator with a 2-meter softbox, and it is not our job to try to achieve the impossible. A photographer has to produce excellent results by pushing the available resources to their limits. This difference is important: if you spend too much time and effort trying to soften your light further than is actually possible, you will simply get frustrated and give up. If, however, you concentrate on the possibilities a location setup offers and use its effects positively, you can often produce fantastic results. Let's take a look at a couple of examples: one outdoors and one in a studio.



Outdoor People Shoot

An outdoor shoot on a sunny summer's day is an extremely challenging photographic situation, even if you are using a modern digital camera with a relatively high dynamic range. The major difficulty involves capturing bright objects (here, the white dress in bright sunlight) and darker objects in a single exposure. The finished image has to show detail in all parts of the image without losing the characteristic look of sunlight.. In this example, our aim is to preserve the natural feel of the lighting in spite of the high range of contrast within the shot.

How can we reduce the dynamic range of our shot? What can we do if the brightest point in the image is too bright, but the darkest is still too dark for the camera's image sensor to capture adequately? The solution is relatively simple:

ISO 50, 1/400 second at f/5.6, flash in master/slave autoflash mode

1. We meter exposure for the brightest point and set the ISO value, the aperture, and the shutter speed so that the brightest parts of the model's dress still show detail.
   This kind of exposure will cause shadow detail to disappear.
2. We add the necessary extra light using our flash unit.

This method brightens darker parts of the image and reduces the overall dynamic range. We used a beauty dish with a steep angle of reflection to produce a natural-looking light interplay between the surroundings and the ground. In other words, we used a "hard" light source to provide wide-area lighting. This worked well with the available light and enhanced the overall sunlit look of the image.

The example image demonstrates several of the advantages of using accessory flash. We used the unit's high-speed flash capability to deliberately underexpose the background, and used its wireless functionality to control the flash head remotely from the camera. The system's adaptability meant we could choose exactly the type of light we wanted to use.

Indoor/Studio People Shoot

If we find ourselves with no sunlight and no identifiable surroundings, we are probably in a studio. Now imagine that our studio doesn't have its own flash system. Here, we can still use a small flash unit to light our subject and, with the right accessories, convert it into a great studio flash setup. You can use the same techniques to transform a white wall at home into a studio too, and you don't need to use multiple flash units to achieve great results. You might find it hard to believe, but a single flash unit is often sufficient for capturing great images.

The next example was taken using a single flash with a diffuser attached. When you are shooting in a studio situation, you have to manipulate your lights to make your model look as attractive as possible, and too much light is often distracting. It is important to emphasize individual elements in an image. For the image on the left we used the dish to soften the general light (by increasing its area in relation to the model) and mounted a honeycomb reflector in the dish to direct light onto the model's upper body. Perfect lighting created using just a flash, a dish, and a white wall!

We booked our studio model at www.model-pool.de.

Left: shot without any accessories
Right: shot using a dish and a honeycomb reflector
Both shots were made using the same camera settings

Accessory flash is powerful enough for many standard situations.

Small details often make a big difference. Our sample images clearly show the differences between images shot with just flash and those shot using additional accessories. The accessorized images display more contrast and a great zoom effect around the model's head and don't require any subsequent image processing. For those of you who are asking yourselves exactly how much power an accessory flash can deliver, here are a few numbers:

> You can use a Canon 580 EX (guide number 58) to produce a well lit photo at a distance of about 2 meters with your camera set to f11 and ISO 100. We ended up shooting at f/7.1 and 1/400 second (at ISO 100) using a 40 x 40 cm softbox at a distance of about 1.5 meters.

This means that this single flash is powerful enough to use in bright sunlight.

Conclusions

Our examples show that light doesn't have to be extraordinary to be effective. The most important thing to remember is that the photographer has to have control over the light, whether it is bright or low-key, hard or soft, direct or diffuse. The actual source is unimportant as long as it is where we need it, when we need it.

Additional information about the flash2softbox adapter and accessory system can be found at www.flash2softbox.com.


PATRIOT

A View From Above

Aerial Photography with a Telescoping Monopod

Mike Hagen

Frequently in photography, the best vantage point for a photo is high above the crowd. Taking all your pictures at eye level can get boring after a while. For years, travel photographers have known that great coverage of every destination should include an opening shot that sets the scene. This opening shot is often taken from the second story of a building or parking garage in order to show the surrounding area from a higher vantage point.

But what happens if you can't get to a higher vantage point? What if the second story of the building is closed? What if you are photographing in a location where there isn't any way to get to higher ground? In these cases, you need to make your own aerial photography monopod.

Aerial photography is typically defined as taking photographs from an airplane, helicopter, or kite. These methods all provide a high vantage point for your photos, but each method has some potential pitfalls. Using an airplane or helicopter is very expensive, and you can't always get into the right spot at the right time due to federal and local flight restrictions. Kite aerial photography requires steady wind, and that isn't always available at the exact time you need it. Also, who wants to attach their $4000 digital SLR to a kite?

A simple solution for getting your camera up into the air for a higher vantage point is to build an extension pole with a ball head on the end. You can then attach your camera to the end of the pole, raise it into the air, and take your photographs.

The easiest way to attach your camera to a pole is to use a monopod. A standard monopod will frequently extend to 5 to 6 feet. If you raise this monopod above your head, you can easily get the camera up to about 10 to 12 feet high. However, many times you need to get much higher than a monopod will allow. In these cases, the best solution might be to use a long wooden pole or a telescoping paintbrush handle extension. This will allow you to raise the camera 20 feet or more into the air in a safe and secure manner.

To get this shot of the fishing boat and harbor, I raised the camera into the air using the extension pole described on the following pages.

Construction of an aerial photography telescoping monopod is fairly simple and straightforward. The foundation of the system is the telescoping extension pole. I purchased the pole for the

Here's what the aerial photography extension pole looks like in use. The pole is approximately 13 feet long, so here it is raised about 19 feet into the air.

example shown here from my local home improvement/hardware store. They had seven different models to choose from, ranging from a small wooden fixed-length model for $7.00 to a 30-foot professional extension pole that cost close to $100.00.

You can use a simple monopod and ball head to raise the camera about 10 feet. But if you need to get your camera higher, you'll need to use a longer extension pole.

I ended up choosing a 12-foot aluminum extension pole with a twist-lock feature that makes it quick and easy to change the length. The pole is 6 feet long when collapsed and 12 feet long when extended. Also, the fact that it is aluminum means that it is lightweight and easy to manage when I am in the field taking photos.

On the following page, table 1 shows the supply list for the project. As you can see, the total cost for building the pole is about $22.15. In addition to the pole, you'll need a standard photography tripod head. As a photographer, I own too many old tripod heads, so I just used one that I had in my closet. You can buy new, low-end ball heads for around $15.00 on eBay.com or Amazon.com. Make sure the tripod head you choose is fairly lightweight so you don't have to work hard to lift it into the air.

Table 2 includes the various tools you'll need for the project. The only power tool you'll need is an electric drill; all the other tools should be fairly easy to come by.

Materials List

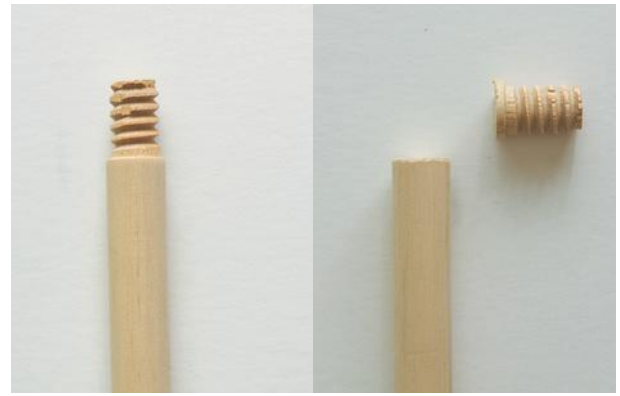
Table 1: Supply List

Item	Approximate Cost (USD)	Where to buy
Extension pole	$15.00	Hardware store
Three piece extension pole	$5.00	Hardware store
Hose clamp 0.5" – 1.25"	$1.00	Hardware store
3/8 – 16" x 3" hanger bolt	$1.00	Hardware store
3/8" washer	$0.15	Hardware store
Tripod ball head	$15.00 – $300.00	Camera shop

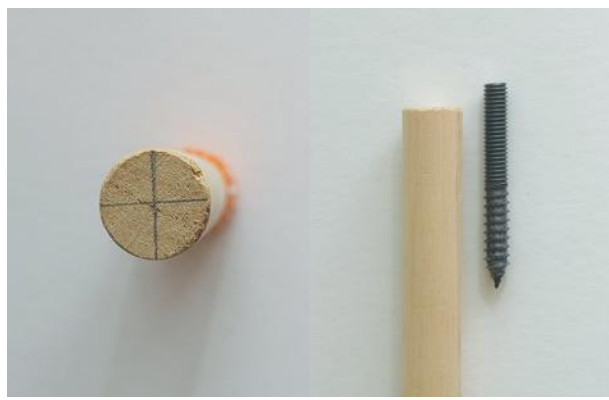
Table 2: Tools

Item	Purpose
Pencil	For marking center of the wood dowel
Straight edge	For marking center of the wood dowel
Saw	For cutting end off wood dowel
Electric drill	For drilling hole for hanger bolt
1/8" drill bit	For pilot hole
3/8" drill bit	For hanger bolt
3/8" washer	For placing between ball head and extension dowel
File or sandpaper	For smoothing end of dowel after cutting
Glue	To secure washer to dowel
Screwdriver	For attaching hose clamp
Vice	To hold dowel when cutting and drilling

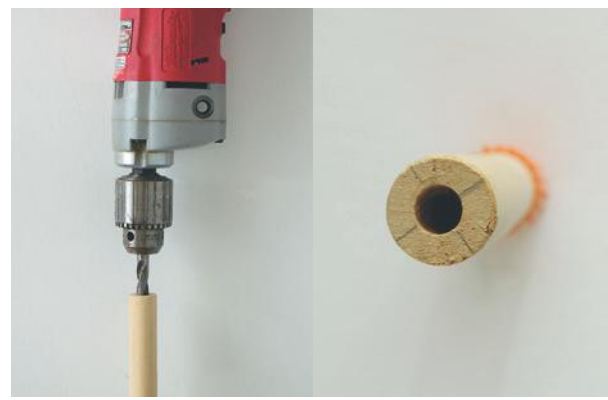
Shown here are the parts needed for the construction of the aerial photography monopod. From the bottom: telescoping paintbrush extension handle, three piece wooden extension pole, hose clamp, 3/8" hanger bolt, and 3/8" washer.



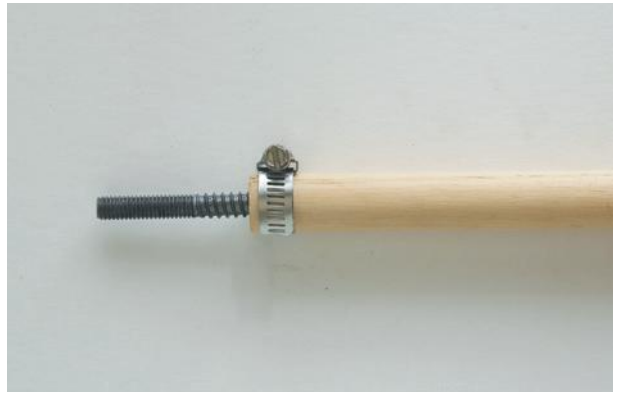
1. Cut the threaded end off of the wood dowel with a saw. The picture above shows how much of the threaded end to remove.
2. File the edges to remove any burrs.



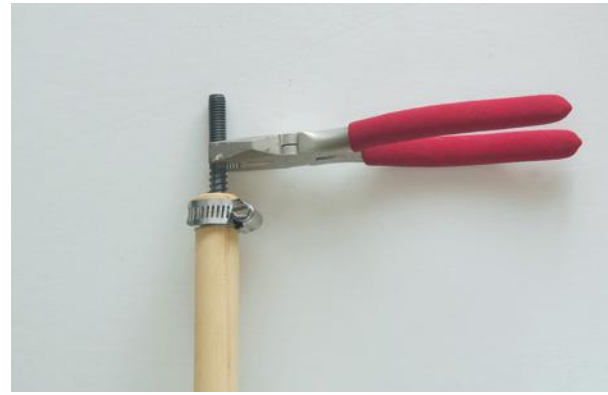
3. Mark the center of the cut end with a straightedge and pencil.
4. Determine how deep your hole needs to be by placing the hanger bolt next to the dowel.



5. Drill a pilot hole with the small 1/8" drill bit. Make sure the hole is parallel to the dowel so that the drill bit doesn't exit the side.
6. Using the larger 3/8" drill bit, drill the hole to the desired depth.



7. Install the hose clamp so the wood won't split when screwing in hanger bolt.



8. Use a set of pliers to install the hanger bolt. Be careful not to use the pliers on the top end of the hanger bolt so that you don't smash the threads.

9. Install the 3/8" washer over the end of the hanger bolt. You may glue this to the dowel if you wish. Use an epoxy for the strongest bond.

I suggest wrapping a rag around the end of the threads so that the pliers don't smash the threads when you install the hanger bolt. Leave approximately 3/8" (9mm) protruding from the end of the wooden dowel.

10. Thread the ball head onto the end of the dowel. Tighten snugly so the base won't rotate when you are using the system out in the field.

11. Screw the dowel extension onto the end of the telescoping paintbrush handle.

Using the Aerial Photography Monopod in the Real World

Putting the aerial photography monopod into use can be a little tricky. Here are some tips for good success with the system:

1. Attach the camera to the ball head first; then extend the monopod to the desired height.
2. Set your camera to manual exposure mode. If you decide to use an auto exposure mode like Aperture priority or Program mode, cover the viewfinder on the back of the camera so bright ambient light doesn't enter the light meter and darken the exposure.
3. Set your camera to manual focus mode and try to pre-focus on your subject before lifting your camera into the air. Autofocus can be very difficult when the camera is up in the air, especially since you won't be able to really tell where the camera is pointed. Using smaller apertures like f/8 or f/16 will also help increase the depth of field in your photographs.
4. You can trigger the camera's shutter using a variety of methods:

   a. My favorite method is to use the camera's self-timer. I set the self-timer delay for five seconds, trigger the shutter release, and lift the camera into the air for the shot. I also set my camera to take five pictures every time the self-timer goes off. I use Continuous Low shooting speed and set the frame rate to 1 fps (frame per second). Using this method, I can try a number of different compositions without having to bring the camera back down to trigger the next shot.

   b. Another method is to use an infrared remote such as the units that are compatible with the Nikon D90/D5000 (ML-L3 or ML-3 Compact Modulite Remote Control Set) and Canon Rebel/5D MKII (RC1 Wireless Remote Control). It can

be a little bit difficult to hold the pole with one hand while also trying to trigger the camera with the other hand.

c. You can also use a radio trigger such as the Phottix wireless remote. You can buy these from eBay.com for around $40. Another option is the Pocket Wizard radio trigger. These units are expensive, but reliable.

d. Finally, you can try using a cable release like the Nikon MC-30 or the Canon RS-80N3. The downside to using a cable release is that these are pretty short and won't allow you to fully extend the pole.

5. Hold as still as possible—any side-to-side rotation will cause blurry images. Use faster shutter speeds and higher ISOs to help decrease blur. Also, stabilized VR/IS lenses work very well.
6. If you are using a super wide angle lens, such as a fisheye or 10mm lens, be sure to shoot with the camera angled away from the monopod rather than into the monopod. If you don't do this, you'll get the monopod and you in the image!
7. If your digital camera has a tilt LCD panel, you can use this in the Live View mode to compose your pictures. Point the LCD panel down towards the ground and aim the camera by using the image on the screen.
8. Shoot at a wider angle than you think you will need. Invariably, you'll need to crop the photo or level the horizon in the final image, so giving yourself room to work with will be helpful.
9. Consider making the pole long enough to be able to place the base on the ground while you're shooting. This will allow you to raise the camera to a significant height without having to lift the pole into the air. Also, this is a very stable way to shoot photos and is similar to using a 25-foot tall monopod.
10. If you have to be mobile while shooting photos, you might consider placing the base of the pole in your belt to take the weight off your arms. This will also help to stabilize the pole.

Real World Photo Examples

On the opposite page are some examples that show how shooting from a higher vantage point can result in better photographs. In both of these examples, I used a Nikon D90 with a 12–24mm f/4 lens. I set the camera's self-timer with a five second delay. I also set the camera to take five pictures after the self-timer tripped the shutter. For the tennis court image, I set the lens' focus to infinity and the aperture to f/8. For the image of the fisherman statue, I set the lens' focus to approximately 8 feet and the aperture to f/11.

The panorama of Gig Harbor, Washington, USA, on the following spread, was taken with a Nikon D200 and stitched together with Photoshop. The photo shown here is a crop of a larger image that contains 15 individual images with an aspect ratio of 1:20. To take great panoramas, you'll need to photograph in Manual exposure mode while also setting your white balance to a fixed value (i.e., Sunny). Then, make sure that you overlap each photo with the adjacent photo by about 25%. This allows your processing software to do a better job of stitching the images together.

Here, the fence is an obvious impediment to getting a photo of the action.

The solution is to raise your camera over the fence using the aerial photography monopod.

A lower vantage point makes the fisherman statue seem unusually large.

The higher vantage point gives this photo a much better perspective. You are able to see the dock and the harbor , and the statue looks much more realistic.


Sound Recorder...
Rotate...
Transfer Order...
Resume
Last seen
Transition
Firm Update...

Camera Hacking

Activating Hidden Functionality in Canon Consumer Digicams

Berthold Daum

One day, curiosity led me to enter the terms "camera" and "hacking" into the search engine that begins with "G". After all, a digital camera is only a computer with some peripherals attached, and I wanted to find out if it is possible to "optimize" the built-in software. My search was a success and immediately took me to the Canon Hacker's Development Kit (CHDK) community page. The forum is run by an active group of programmers and photographers whose aim is to enhance and extend the functionality of Canon's consumer digicams to an extent that will make many owners of expensive DSLRs green with envy. These hacks work particularly well for Powershot and Ixus models built around the DIGIC II and DIGIC III processors. The CHDK website at http://chdk.wikia.com is entirely noncommercial and is run by volunteers. Wikia only handles the wiki infrastructure and its own advertising.

Modifying Your Firmware

CHDK functions very simply. All you have to do is save the downloadable CHDK firmware onto a memory card, insert the card into your camera, and power up. The modified firmware then runs instead of the camera's standard firmware, either manually (see the illustration below) or automatically at startup. Switching the camera off and removing the CHDK firmware from the memory card returns both to their original state and leaves all warranties intact.

Installing CHDK

To begin, check to see if one of the community members has already made a CHDK version for your particular combination of camera model and firmware. Because of the time and effort involved, stable CHDK versions are more likely to be available for older cameras. If you have a newer model, you will either have to wait or program your own version of CHDK. The community is, of course, grateful for any new contributions to its knowledge pool.

The first thing to do is go to: http://chdk.wikia.com/wiki/Downloads. If you don't know your firmware version #, download any CHDK version for your camera model and unpack it to a FAT16 formatted memory card (using either your computer's built-in card reader or an external reader). The current card capacity support limit is 4 GB, although larger cards can be used with some fairly complex tweaking. The free Card Tricks utility (also available at the CHDK website) is a useful card formatting tool. Once you have unpacked your CHDK firmware, you will find a file called either ver.req or vers.req on your memory card. You can use this file to discover which firmware version your camera is running by following these steps:

1. Switch your camera off.
2. Set your camera to playback mode.
3. Switch your camera back on.
4. Press and hold the FUNC./SET button and then press the DISP. button.

The firmware version will now appear beneath other information on the monitor and will look something like this: Firmware Ver GM1.01B. You can now download the appropriate CHDK version for your camera and unpack it to your memory card.

Firmware information for a PowerShot SD1100 IS. Pressing the DISP. button while holding down the FUNC./SET button displays additional information.

Loading CHDK manually using the "Firm Update..." command

In order to load CHDK, leave your camera in Playback mode, press the MENU button, and navigate to the last item "Firm Update...". Now press FUNC./SET, choose OK and press FUNC./SET again. CHDK will now load and the CHDK logo will be displayed after a few seconds. The update is temporary, and the firmware only remains loaded until you switch your camera off. If you want CHDK to load automatically when you switch your camera on, you first have to make your memory card bootable. To do this, press the PRINT/SHORTCUT button and then press the MENU button. This will take you to the CHDK menu. Go to "Miscellaneous Stuff" and then select "Make SD card bootable" and press FUNC./SET once more. Now switch your camera off, switch on the Write Protect switch on your memory card (to tell the camera to boot from the card) and restart your camera. CHDK overrides the write protect function and allows you to shoot and save images normally.

If you switch Write Protect off, your camera will start normally. Remember, formatting the memory card will also erase CHDK. If you want to erase images, use either the camera's erase function or the CHDK file browser (ALT>MENU>Miscellaneous Stuff>File browser). Here, you can use the DISP. button to erase entire folders.

RAW Processing

What can CHDK actually do? CHDK was originally created by the Russian programmer VitalyB to equip the "smaller" Canon digicams with RAW functionality. This aspect of CHDK is nowadays quite advanced, and you can use CHDK to tell your camera when and when not to use RAW mode while shooting—a function that even some full-blown DSLRs still don't have. Some of the newer CHDK versions are even capable of outputting images to the manufacturer-independent DNG (digital negative) format, and can perform RAW processing and noise-reducing merges in-camera.

Additional Functionality

CHDK is constantly being expanded to include new functionality while leaving the existing camera functions untouched. These additional functions include:

- The CHDK battery level indicator. This tool is accurate and keeps you continuously informed of power levels, not just shortly before your battery dies. It is worth keeping CHDK loaded for this function alone. You can also check sensor, lens, and battery temperature.

- A configurable live histogram display, which shows the distribution of tonal values for the individual color channels in your subject before you release the shutter.

- Zebra mode, which displays under- and overexposed areas in an image. This is also a "grown-up" feature found in many DSLRs and is a great aid to finding the right exposure values.

- Manual adjustment of aperture, shutter speed, ISO, and distance settings. Shutter speeds as fast as 1/60,000 second have been achieved in cameras with electronic shutters. CHDK also allows you to set long shutter speeds of up to 64 seconds.

- Edge overlay, which recognizes edges within an image and displays them in the viewfinder. This helps you to align sequences of shots for stereo or panorama use.

- Stepless video compression rates.

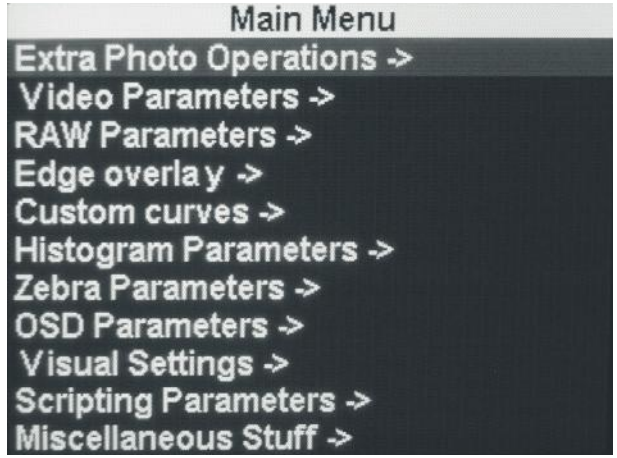
- A whole bunch of other useful features, including a file browser, a calendar, a text file reader (useful for user manuals!), and even some games.

Scripts

Last, but not least, CHDK also allows you to write your own scripts for automating camera functionality. There are two scripting languages available: uBasic (easier for beginners) and Lua, which is also the scripting language used in Adobe's Photoshop Lightroom. Lua is approximately 100 times faster than uBasic when run under CHDK and includes additional commands. You will need some programming knowledge to write scripts using Lua, but anyone can run the large number of finished scripts that you can download from the CHDK website. There are four main types of scripts that are the most popular:

- Interval Timer. There are a many scripts dedicated to interval photography and time-delay video. Unlike the original built-in continuous shooting mode, the scripted version can be set to meter each shot of a series individually. You can find a particularly impressive example of how to use this function at Francesco Bonimi's website: www.francescobonomi.it/ballon-photography-CHDK . Francesco used a hydrogen balloon to send a PowerShot SD1100 IS twenty miles up into the atmosphere, where the camera began to take photos automatically. The camera returned to earth by parachute.

- Remote release. You can build a simple remote shutter release for your camera using a mini USB cable and a battery. You can also use scripts to control other camera functions (such as zooming) using different combinations of



The main CHDK menu. The choice of settings is almost overwhelming. The menus can be displayed in a number of different languages and you can even customize the typeface and the colors.

pulses and the same USB cable. This is particularly useful for aerial photography, using a microcopter as an aerial camera platform, for example. See also the Kite Aerial Photography chapter in this book.

- Bracketing sequences for shooting source material for HDR or focus stacking applications. The script causes the camera to shoot multiple images with varying shutter speeds or focus settings that can then be merged to a single image on a computer with the help of specialized software.

- Motion Detection. Here, the shutter is released by movement within the frame. You can leave your camera unattended and it will shoot automatically when there is movement detected in front of it. You can even use this function to photograph lightning flashes: you need to prefocus, but the 60 milliseconds between the beginning and end of a lightning flash are long enough for the script to release the shutter. This function is also very effective for photographing animals and for surveillance use. The script uses the same movement analysis software module that the camera normally uses to optimize shutter speed and ISO settings, which is why motion detection only works if the display (and with it, the sensor) is switched on. If you want to save power, you can insert an AV plug into the camera's AV socket. This switches the display off but leaves the sensor active.

The availability of the CHDK motion detection functionality was the main reason I ended up purchasing a PowerShot SD1100 IS. The camera is cheap, compact, and fast, and its 3x optical zoom delivers 8-megapixel images with bright, well saturated colors.

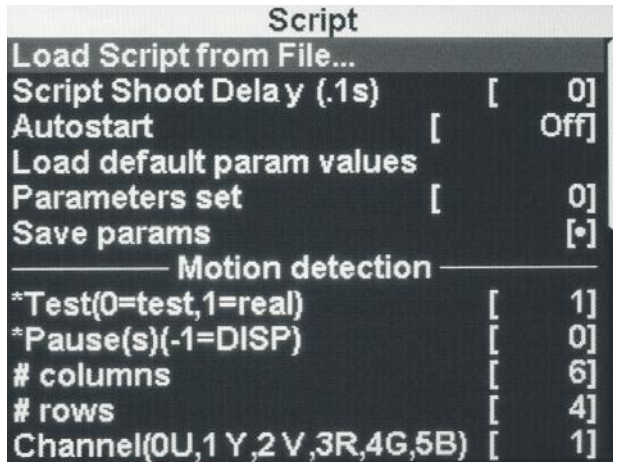
Motion Detection Scripts

I found a number of working motion detection scripts on the Internet, most of which are camera-independent and which offer up to twelve different parameters for use with the uBasic `md_detect_motion` command. These parameters make it possible to detect motion in selected parts of the frame, or to determine whether the camera reacts to fast or slow movements. You can also determine the focusing time or the length of your image (or video) sequence. This slew of parameters makes using the script less practical in the field, so the best solution is to implement your own scene programs that you can select at the push of a button to fit the subject and the surroundings. I will describe one such script in the following sections, but first, I would like to go into a little more detail concerning the `md_detect_motion` command.

The parameters available for this command are as follows:

`a,b`	are the numbers of columns and rows that make up an image. These numbers allow you to select which cells to activate within the frame (see also parameters `i,j,k,l,m`). The finer the grid, the smaller the objects you can detect, but the slower the script reacts. The grid relates to the image displayed on the camera's monitor, not the sensor's surface. This is only a problem if digital zoom or digital macro is activated, as the monitor then only displays the virtually zoomed section of the image.
`c`	is the active color channel: 0 = U channel (green/blue) in the YUV color model 1 = Y channel (brightness) in the YUV color model 2 = V channel (red/green) in the YUV color model 3 = Red channel in the RGB color model 4 = Green channel in the RGB color model 5 = Blue channel in the RGB color model
`d`	is the script delay time (in milliseconds) after which the script resumes, regardless of whether movement has occurred or not. This function is useful for periodically correcting the metering settings.
`e`	is the time-lag (in milliseconds) between before/after comparisons. Larger values help to detect slow changes within the frame, such as a sunrise.
`f`	is the threshold value for changes in brightness. This activates an event if the change in brightness in at least one cell is greater than the threshold value for the active color channel. The larger the threshold value, the less sensitive detection will be.
`g`	determines whether the grid is displayed on the monitor (0 = no, 1 = yes).
h	is the return value and indicates the number of cells in which changes above the threshold value f have occurred. A zero return value indicates that the delay d ended. .
`i`	activates masking mode and limits detection to the cells defined using the `j, k, l,` and `m` parameters: 0 = no mask 1 = everything within (`j,k,l,m`) 2 = everything outside (`j,k,l,m`)
`j,k`	first row and column
`l,m`	last row and column
`n`	is the release mode: 0 = the shutter is released by a script command. 1 = direct release without focusing, which only works if exposure and focus have been preset. 9 = direct release via a script command.
`o`	is the subsampling parameter. Only every oth pixel is analyzed. Larger values accelerate detection but make it less precise.
`p`	is the shutter delay (in milliseconds). The camera's shutter usually requires some time (about 100 msec) in order to perform a calibration. You should only use a zero value if your application is extremely time-critical (lightning photography, for example).

CHDK also includes a second command (`md_get_cell_diff: i,j,k`) for analyzing detected movements more precisely. This command analyzes the change in cell `i,j` and returns a value between 0 and 255 to the variable `k`. If you program this command to perform a loop that checks k for a zero value, the shutter will fire when a detected movement stops.



The Script menu. The lower part of the screen contains the start of the parameter list for the active script. You can use the Autostart parameter in the upper part of the screen to start the script automatically the next time the camera is powered up. This can be useful if, for example, you always want to start your camera with the same settings.

Configuring a Script

After you have installed CHDK on your memory card, you will find a CHDK/ folder alongside the usual DCIM/ folder. This contains the SCRIPTS/ subfolder, where you can save any scripts you want to make available to the firmware. You can then access your script by starting your camera with CHDK (see above) and switching to ALT mode. ALT mode is activated in G- and S-series cameras by pressing the SHORTCUT button, and in all other models by pressing the PRINT button. Activated ALT mode is indicated by the <ALT> icon at the bottom of the monitor and fundamentally changes the way the camera functions. Most of the buttons (including the shutter button) now only have a function if a script is running. Pressing the MENU button takes you to the CHDK main menu, with its enormous range of settings. You can now use the FUNC./SET button to jump to the Script menu, where selecting "Load script from file..." takes you to a list of available scripts. The parameters available for the selected script can be seen at the bottom of the menu. Press MENU again to exit the menu and press the shutter button to execute your script. Pressing the shutter button again stops the script.

Sample Script

Below is a complete uBasic motion detection script:

```
@title Motion Detection
@param s *Test(0=test,1=real)
@default s 1
@param v *Pause(s)(-1=DISP)
@default v 0
rem Only for program >Parameter<
@param a Columns
@default a 4
@param b Lines
@default b 4
@param c Channel(0U,1Y,2V,3R,4G,5B)
@default c 1
@param d Time-out(s)
@default d 170
@param e Detection interval(ms)
@default e 1
@param f Threshold(0-255)
@default f 10
@param i Mask(0=No 1=in 2=ex)
@default i 1
@param j First mask column
@default j 2
@param k First mask line
@default k 2
@param l Last mask column
@default l 3
@param m First line column
@default m 3
@param o Subsampling (pixel)
@default o 6
@param p Delay (0.1s)
@default p 1
@param t Duration series/video
@default t 5
@param u Prefocus(0=No,1=auto,>1=cm)
@default u 1

rem Program Selection
y = 0
do
  cls
  print "Select prog: UP/DWN/SET"
  if y=0 then print ">Parameter<"
  if y=1 then print ">Lightning<"
  if y=2 then print ">Cloudy/Interior<"
  if y=3 then print ">Sunny<"
  if y=4 then print ">Detail<"
  if y=5 then print ">Macro<"
  if y=6 then print ">Hat<"
  wait_click 10000
  if is_key "up" then y = y-1
  if y<0 then y=6
  if is_key "down" then y = y+1
  if y>6 then y=0
until is_key "set"

rem Lightning
if y = 1 then
  a=4 rem 4x4-grid
  b=4
  c=1 rem luma-channel
```

```
  d=300 rem 5min time-out
  e=1 rem high speed (1ms)
  f=10 rem high sensitivity
  i=0 rem no mask
  o=6 rem every 6th pixel
  p=0 rem no delay
  t=2 rem 2s video duration
  u=1 rem prefocus auto
endif
rem Cloudy/Interior
if y = 2 then
  a=4
  b=4
  c=1
  d=170 rem time-out 170s
  e=1
  f=24 rem low sensitivity
  i=1 rem interior mask (2,2,3,3)
  j=2
  k=2
  l=3
  m=3
  o=6
  p=1 rem 100 ms delay
  t=5 rem video duration 5s
  u=1
endif
rem Sunny
if y = 3 then
  a=4
  b=4
  c=1
  d=170
  e=1
  f=12 rem medium sensitivity
  i=1
  j=2
  k=2
  l=3
  m=3
  o=6
  p=1
  t=5
  u=1
endif
rem Detail
if y = 4 then
  a=12 rem 12x12-grid
  b=12
  c=1
  d=170
  e=50 rem medium speed (50ms)
  f=20
  i=1 rem interior mask (2,2,11,11)
  j=2
  k=2
  l=11
  m=11
  o=1 rem each pixel
  p=1
  t=5
  u=0 rem immediate focus
endif
```

```
rem Macro
if y = 5 then
   a=5 rem 5x5-grid
   b=5
   c=3 rem red channel
   d=300 rem time-out 5min
   e=10 rem medium-fast(10ms)
   f=12 rem medium sensitivity
   i=1 rem interior mask (3,3,3,3)
   j=3
   k=3
   l=3
   m=3
   o=6
   p=1
   t=5
   u=1
endif

rem Hat
if y = 6 then
   a=1 rem 1x1-grid
   b=1
   c=1
   d=300
   e=10
   f=24 rem low sensitivity
   i=0 rem now mask
   o=12 rem every 12th pixel
   p=5 rem 500 ms delay
   t=5
   u=0 rem immediate focussing
   if v<1 then
        v=5
     endif
   print v;"s Pause"
   sleep v*1000 rem wait 5s before starting
endif

rem inhibit invalid parameters
if k>b then k=b
if k<1 then k=1

if m>b then m=b
if m<1 then m=1

if j>a then j=a
if j<1 then j=1

if l>a then l=a
if l<1 then l=1

rem retrieve shooting mode
if s<>0 then
   s=1
   r = get_drive_mode rem (0=single, 1=continu-
ous, 2=self timer)
   if r=1 then s=2
   r = get_mode
   if r=2 then s=3 rem video
endif

rem scale parameters
if u=1 and s<2 then n=9 else n=0
```

```
if i>0 then g=1 else g=0
p=p*100
d=d*1000

rem event loop
q = 1;
print "Stop: Shutter Button"
while 1
   if s>0 and s<3 and u>1 then set_focus u*10

rem fixed distance
  if s>0 and s<3 and u=1 then gosub "focus" rem
prefocus
   md_detect_motion a, b, c, d, e, f, g, h, i,
j, k, l, m, n, o, p
    if h>0 and s>0 and s<3 and u=0 then gosub
"focus" rem focus when shooting
      if h>0 and s=1 and n=0 then press
"shoot_full" rem shoot
   if h>0 and s=2 and n=0 then gosub "series"
   if h>0 and s=3 and n=0 then gosub "video"
   if h>0 then print "Rec."; q, "Fields:", h
   if v<>0 then gosub "pause"
  if h>0 and s=1 then release "shoot_full" rem
release shutter
  if h>0 and s>0 and s<3 then gosub "wait" rem
wait until done
   if h=0 then gosub "wakeup" else h = 0 rem
inhibit auto powerdown
   q = q + 1
wend

:focus
   press "shoot_half"
   do
     r=get_shooting
   until r=1
return

:series
   press "shoot_full"
   sleep t*1000 rem wait for duration
   release "shoot_full"
return

:video
      click "shoot_full"
      sleep t*1000
      click "shoot_full"
return

:wakeup
  release "shoot_half"
  if n=1 then
     click "set"
     click "set"
  endif
return

:pause
  if v < 0 then
  do
       cls
     print "Continue: DISP"
```

```
      wait_click 3000
   until is_key "display"
   else
   sleep v*1000
   endif
return

:wait
    do
      r=get_shooting
    until r=0
return
end
```

The script header contains definitions of the individual parameters and their default values. The parameters with an asterisk * are always available, while the others can only be set if you first select the scene program "Parameter". You can navigate through those scene programs by using the UP, DOWN and FUNC./SET buttons.

The scene programs described here are only suggestions and can be altered freely, depending on the camera you are using and the type of photos you want to take. CHDK scripts have a maximum possible size of eight kilobytes.

The script in action. The live histogram and the name of the active script are visible at bottom left. Pressing the shutter button starts the script: as soon as the cat moves, the shutter will fire.

Here are a few notes about the options included in the script.

- The fastest possible setting has been selected for the >Lightning< scene program. A zero value for the shutter delay (`p=0`) and the prefocus setting (`u=1`) ensure that the shutter can fire immediately when a lightning flash occurs.

- The >Detail< scene program uses a 12 x 12 grid in order to detect the smallest possible moving objects. Here, medium fast to slow movements can be detected (`e=50`). Because speed is less important, focus is set immediately before the shutter is released (`u=0`).

- The >Macro< scene program uses only a small area in the center of the frame for motion detection in order to prevent leaf and grass movements from releasing the shutter. For the same reason, the red channel (`c=3`) is analyzed instead of the brightness channel; consequently, the movements of green leaves remain undetected.

- The >Hat< scene programis a special function. The camera is set up to be covered by a hat. If something interesting happens, the hat is removed and the shutter fires.
  There is a built-in pause, so that there is time to cover and uncover the camera. The shutter delay is quite long (`p=5`) so that the camera doesn't fire prematurely. Here too, focusing occurs immediately before the exposure is made (`u=0`). No grid is necessary as the camera only needs to react to global changes in brightness.

Once all parameters have been set, the event loop begins. If necessary, a halfway press of the shutter button is simulated so that the camera can focus and meter the shot. The `md_detect_motion` command now waits for motion to occur. The shutter is released either directly by the command or subsequently by pressing "`shoot_full`". If the camera is set to continuous shooting or video mode, a release of appropriate length (`t`) is caused either by the "continuous" (series) or the "video" subroutine. In Single Shot mode, the shutter remains pressed for as long as the delay (`v`) dictates until releasing "`shoot_full`" once again releases the shutter. During the delay, the monitor displays the captured image along with the most important data for judging image quality. The loop then waits until the camera has finished processing the image data and then begins again. All processing steps within the event loop need to be as fast as possible and uBasic running in CHDK creates a ten millisecond break at the end of each line to allow the camera to deal with other events, so it is important to have as few lines of code as possible in this part of the script.

Conclusions

CHDK and the CHDK community are a lot of fun. The CHDK forum at http://chdk.setepontos.com offers tips and tricks for all user levels and is an important place for exchanging ideas. The fact that CHDK gives cheap, compact cameras the functionality of much more expensive models makes it possible to achieve professional-looking results on a budget. An interesting CHDK sideline is the Stereo Data Maker (SDM). This version of the software doesn't include all the basic CHDK functions but is customized for producing stereoscopic and aerial images. The program can, for example, use a USB cable to precisely synchronize two cameras shooting with 1/16,000 second shutter speeds. Additional information is available at http://stereo.jpn.org/eng/sdm/index.htm. The Magic Lantern Firmware Project (http://magiclantern.wikia.com) is a similar project that is dedicated to enhancing the video functionality of the Canon 5D Mark II DSLR. The Pentax Hack project (for the Pentax K7, K10D, GX10, K20D, and GX20 models) is just starting up. Already there are CHDK versions available for some Canon EOS DSLRs, and additional information on this topic can be found in the CHDK forum under CHDK Development > General Discussion and Assistance > DSLR CHDK development.

Berthold Daum is author of the book *The Canon Camera Hackers Manual: Teach Your Camera New Tricks*, Rocky Nook, 2010.

Right: The wild side of my garden. This image shows a honey bee on a borage flower, which I shot using my Canon PowerShot SD1100 IS. The CHDK motion detection script was set to >Macro<: 6.2 mm (~37 mm), f/2.8, ISO 80, and 1/125 second. The file was saved in DNG format, which I then developed using Capture One 4.

The Authors

Michael Benecke

Michael Benecke was born in 1965 in Hamburg, Germany. Having shot his first photos on a 6x6 box camera as a preschooler, he inherited a Voigtländer from his grandfather and has been infected with the photo virus ever since. His job in design and printing introduced him to the early digital imaging revolution, and he has been shooting exclusively in digital since the year 2000. His current camera is a Four Thirds system Olympus E-420. He processes his images on a Mac and is a great proponent of home printing, as this is "the only way to keep full control of an image".

Michael has lived in the Lower Rhein area of Germany for the past fifteen years. He draws inspiration for his photos from the tension between industrial development and the natural environment near his home.

Christian Bloch

Christian Bloch is a visual effects artist who lives and works in Hollywood, California.

The last six years of his career have seen him create effects for TV series such as *Star Trek, Smallville, Invasion, Lost, 24, and Studio 60*, as well as for numerous movies and advertisements. His work has been honored with an Emmy and has also been nominated for a Visual Effects Society Award. He is considered to be a pioneer of the use of HDRI techniques in the high pressure worlds of TV and movie post-production.

Christian graduated in media studies at the Leipzig University of Applied Science in Germany and wrote his degree thesis on his favorite subject, "The Practical Usage of HDRI Imaging in Post-production". His thesis was awarded a scholarship by the university.

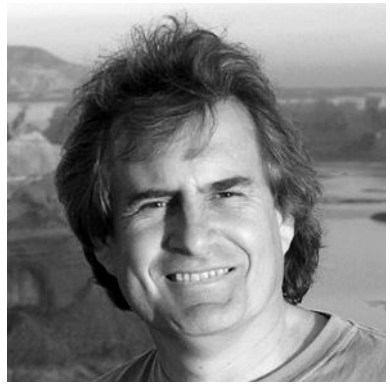
Anett Boettcher

Anett Boettcher is a qualified office clerk and design assistant, and has run her own successful portrait and wedding photo studio for some time now. She is an unconventional, spontaneous, and emotional artist. Passion and inquisitiveness are more important to her than technique when she is creating images. She finds her subjects spontaneously in everyday situations, and post-processing using Photoshop is an integral part of her workflow. You can view some of her work at www.anett-boettcher.de.

Berthold Daum

Berthold Daum studied photography in Melbourne, and has published his Australian photos in various exhibitions and books. In addition to his enthusiasm for photography, he has a real passion for his job in information technology. He has a doctorate in mathematics and is an expert in the development and application of programming languages and databases. He has lectured and written books on both subjects.

Berthold's "camera hacks" form an interface between IT and photography, and his new book *The Canon Camera Hackers Manual* was recently published by Rocky Nook.



Alain Briot

Alain Briot creates fine art photographs, teaches workshops, and offers DVD tutorials on composition, printing, and marketing photographs. Alain is also the author of *Mastering Landscape Photography* and *Mastering Photographic Composition, Creativity, and Personal Style.* Both books are available from Amazon and other bookstores as well as directly from Alain. Alain's third book, *Marketing Fine Art Photography*, will be published by Rocky Nook in 2011. You can find more information about Alain's work, writings, and tutorials on his website at http://www.beautiful-landscape.com.

Alain welcomes your comments on this essay as well as on his other available essays. You can reach him directly by email at alain@beautiful-landscape.com.

You can also see a new online portfolio of Alain's Landscape Blurs at http://www.beautiful-landscape.com/Portfolio-Blurs.html

Michael Diechtierow

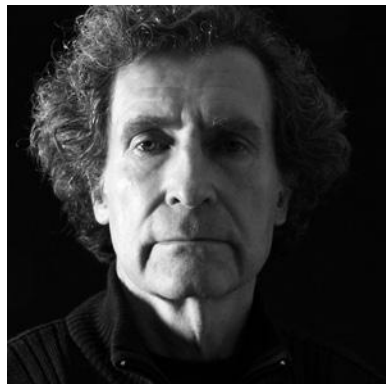
Michael Diechtierow started taking photos at a young age, having bought his first analog SLR with money from his confirmation. Unfortunately, because he had neither the money nor the patience for buying and developing film, the camera ended up hardly used. His real start in photography came with the purchase of a digital compact camera that he used to make hundreds of images of variations on themes. He now uses a Nikon D300 and his collected experience to photograph a little more systematically! He is always experimenting with new photographic techniques and is especially interested in the creative use of flash.

Mike Hagen

Mike Hagen is a passionate adventurer and successfully combines his photographic skills with his love of nature. As a digital photography teacher, location scout, and workshop leader, he contributes regularly to a number of magazines and websites. Mike founded his company, Out There Images (OTI), in 1998 in order to communicate his love of photography to other people. He is well known for his energy and enthusiasm and, if you should get to take part in one of his workshops, you too will be captivated by the patience and infectious verve he uses to communicate his knowledge to his students. Mike lives and works in Washington State, USA.

Cyrill Harnischmacher

After studying art and working for several years as a graphic artist in various advertising agencies, Cyrill Harnischmacher started his own graphic design agency in 1997. Over the years, he has written many articles for specialty magazines on the subjects of photography and digital image processing, and designed books for various publishers. He is experienced both as a photographer and a photographic contractor, and is especially interested in macro photography and unusual technical solutions to photographic problems. He has written three books, all of which have been awarded German book prizes and that have been translated into several foreign languages.



Gottfried Huettemann

Gottfried Huettemann was born in Berlin, Germany in 1940. He studied painting and art history at the Academy of Fine Arts in Karlsruhe, Germany, as well as English and indology at Heidelberg University. He worked as a teacher at various schools, managed an editorial office in Benares, India for a time, and is now retired. He has been involved in the arts all his life and nowadays takes photographs using an analog, medium format Hasselblad and a digital compact. He is a member of the German Photographic Academy and the artists' association in Baden-Württemberg, Germany.

Martin Krolop

Martin Krolop only began to take photos in 2006, but has pursued photography with a real passion. His favorite themes are action and people photography, but he also likes to shoot large-scale set pieces that include street scenes and even fictitious SWAT missions. Martin is self-taught and writes a photographically-themed blog at www.krolop-gerst.com/blog when he is not busy with other photographic assignments.

Michael & Karen McAllister

Michael and Karen McAllister live and work in Santa Barbara, California. Michael has been a keen nature photographer for many years, and his enthusiasm has turned into a hobby for both him and his wife. They spend a large part of their free time in the desert regions of California and Arizona where they document not only the unique landscapes and fauna of the region, but also the rock formations and early Indian settlements in the southwestern USA. On their search for new outdoor photographic techniques, they came into contact with Kite Aerial Photography (KAP), which now forms a major part of their photographic work. You can find more information at www.kiteaerialphotographer.com.

Niklas Plessing

Niklas Plessing is a 22-year-old information technology student from Heidelberg, Germany, and has been a hobby photographer since he was sixteen. Although he is too young to have been an active analog photographer, he is nevertheless influenced by analog values and techniques. He considers the quality of an image to be more important than the quantity of images shot—a parameter that is nowadays only limited by memory card capacity. He chooses his subjects carefully, as if the high cost of shooting analog photos still applies to his work. He came into contact with light writing after hearing about the pioneering German light writing group "Lichfaktor", which roughly translates as "The Light Factor". Since then, you can regularly find him out and about with his friends, his camera, and his lights, on the lookout for new ideas.

Tobias Pohl

Tobias Pohl began to take photos while documenting his voluntary work with various youth groups, and quickly began to experiment with black and white darkroom techniques. During his studies to become a photographic engineer, he and his fellow students took part in numerous analog and digital projects with the motto "maximum image quality and creativity with minimum resources". Tobias uses as little technology as possible and focuses primarily on image composition. He is a passionate monochrome photographer and still shoots much of his work on film. He scans his images and applies a minimum of post-processing before printing them on fine art papers using a customized inkjet printer converted for use with grayscale inks.

Gerhard Rossbach

Gerhard Rossbach developed a taste for photography in the 1950s, carrying his dad's tripod before taking his own first steps as an action photographer using an Agfa Isolette. His first camera didn't survive the rigors of kindergarten life but, as joint owner of the dpunkt and Rocky Nook publishing houses in Heidelberg, Germany and Santa Barbara, USA, he has nevertheless managed to turn his hobby into his profession. He has spent the last five years publishing numerous books on various photographic themes on both sides of the Atlantic. Gerhard is a passionate photographer, and although he has realized that others can do it better than he can, he still loves to take pictures. This insight also helps him to appreciate and nurture the work of his many authors.

Kai Wallasch

Kai Wallasch was born in 1971 and has been taking photographs since childhood. He has also been diving in Europe and overseas for more than twenty years. In addition to being a keen surface landscape photographer, he has specialized in photographing tricky underwater scenes in wrecks and caves, and at depths that can only be safely reached using mixed gas diving techniques.

He is especially interested in diving using rebreather gear, as this allows him to best observe and photograph undersea fauna in its natural environment.